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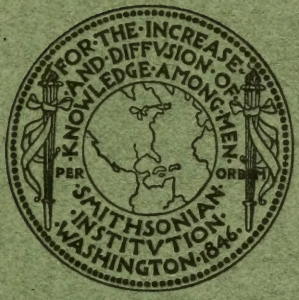
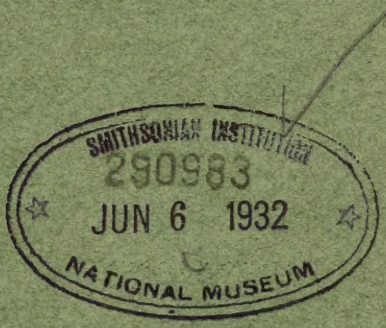
BULLETIN 104

A SURVEY OF PREHISTORIC SITES IN THE REGION OF FLAGSTAFF, ARIZONA

BY
HAROLD S. COLTON





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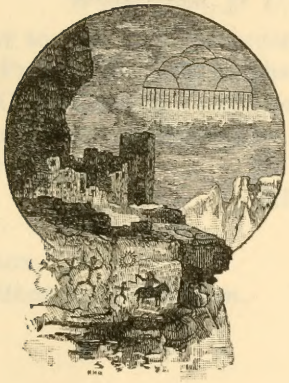

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LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION,
BUREAU OF AMERICAN ETHNOLOGY,
Washington, D. C., February 17, 1931.

SIR: I have the honor to transmit the accompanying manuscript, entitled "A Survey of Prehistoric Sites in the Region of Flagstaff, Arizona," by Harold S. Colton, and to recommend its publication as a bulletin of the Bureau of American Ethnology.

Very respectfully yours,

M. W. STIRLING,
Chief.

DR. CHARLES G. ABBOT,
Secretary of the Smithsonian Institution.

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A SURVEY OF PREHISTORIC SITES IN THE REGION OF FLAGSTAFF, ARIZONA

By Harold S. Colton

INTRODUCTION

The present report deals with an archeological survey of a small portion of northern Arizona lying between the San Francisco Peaks and the Little Colorado River. While the report includes most of the sites in the areas drained by Walnut Creek and Deadmans Wash, it purposely excludes sites on the intervening watershed. The report summarizes the results of a study extending through 10 summers (1916, 1919, 1921, 1923, and 1925–1930). It aims to present three aspects: The distinctive features of individual ruins, the relations of the early cultures with those of neighboring regions, and the relations of occupied regions with features of the external environment. Such a survey can never be said to be complete, yet it is important that the present knowledge of the region be recorded.

Although the region about Flagstaff has long been known as the center of a large ancient population, relatively little study has been given to the remains. This seems strange when we compare the number of ruins here (649 recorded) with those in other places, and appears stranger still when we consider the accessibility of the ruins to modern routes of transportation. Casual visits by Powell (1891), Stevenson (1887), and Fewkes (1900, 1904) are the only references to the region prior to 1916 by trained observers. Popular accounts have flowed from many pens and have appeared from time to time in magazines and newspapers (Alliot, 1914). Two reasons can be found for the lack of investigation, both having to do with the accessibility of the region to the railroad and highway. On first glance it would seem that the investigator was repelled by the nearness to civilization and having traveled far preferred to go farther on into the wilds. Be that as it may, the accessibility of the region to investigators made it also accessible to pot hunters who early exploited and nearly destroyed the cliff ruins where interesting textile and basket remains have been preserved. The relatively heavy rainfall (15–25 inches), poor building materials (lava rock), and porous soil, all contributed to the lack of preservation of artifacts other than

those made of stone or clay. Notwithstanding the early neglect, Fewkes in 1926 excavated Elden Pueblo, from which a representative collection of pottery was obtained. In 1928 Dr. Byron Cummings began the excavation of the Turkey Hill ruin. When the material from these sites is studied much light will be cast on the prehistoric pueblo art in this peripheral area.

Since the burial grounds of the ancient pueblos and small house sites have proved so rich, what remains is rapidly falling into the hands of the commercial pot hunter. A careful survey is, therefore, necessary at the present time.

This paper was prepared for publication in 1923. At that time very few sites were found in a line about 6 miles wide running east from the San Francisco Mountains to the Little Colorado—the divide between the Walnut-Rio de Flag drainage and the Deadman drainage. For this reason maps were not prepared. Since then dozens of sites have been discovered in that string of townships. Since they form the basis of another paper now in preparation they are omitted from the present survey.

The writer wishes to thank Mr. J. C. Clarke, Mr. L. F. Brady, Mr. F. C. Baxter, Mr. E. L. Burnham, Dr. Edwin Helwig, Mr. Lyndon L. Hargrave, Miss Katharine Bartlett, and particularly his wife, Mary-Russell F. Colton, all of whom aided him in his search for sites.

GEOGRAPHY

The high plateau of Arizona culminates in the San Francisco volcanic field. This volcanic region is surpassed only by the Columbia River field, and is therefore the second largest in the country, supporting over 200 extinct cones of various sizes, shapes, and ages; the tallest cone forms the massif called the San Francisco Peaks (altitude 12,700 feet) and is the landmark of north central Arizona. Shelving eastward from the peaks the plateau dips into the valley of the Little Colorado River and rises again in a series of great steps of varicolored cliffs called the Painted Desert, the last cliff forming the mesas on which the Hopis built their pueblos. So the San Francisco Mountains see the sun rise over the Hopi mesas, and the Hopis watch the sun set behind the San Francisco Peaks.

The structure of the earth beneath the San Francisco Mountain volcanic field is important, if we are to understand the conditions under which the ancient inhabitants lived. Beneath the fields of lava and ash the Moencopi red sandstones and shales cover wide areas and outcrop beyond the lava fields by the Little Colorado. This deposit is important because it is the only rock that holds water over a very wide area. (Moencopi is said to be a Hopi word meaning the place of running water.) Where the Moencopi has not been stripped off in

the process of erosion we may look for springs. The springs north of Flagstaff—Rodins Spring, Little Rodins, and Heisers Spring—are all in the red rocks; and there is reason to believe that under outcrops of the Moencopi lies the porous Kaibab limestone, a sandy limestone, much fractured and cracked—a rock which holds no water. Because of its hard texture, when the soft Moencopi is removed, it remains. Over large areas, therefore, the Kaibab limestone forms the surface of the plateau. Since it is porous, no springs are associated with it. Like other limestone rocks, clay is a by-product of its weathering and dams in the canyons and washes will hold the water for some time. Beneath the Kaibab limestone the Coconino sandstone forms a thick layer. Although it does not outcrop extensively on the plateau, it is important because it forms a precipitous cliff in the canyons wherever the intermittent streams have cut deep enough to expose it. Like the Kaibab above, it is waterless. The only rocks which bear water are the red Moencopi shales and sandstones. These exposures are limited to the fringes of mesas and a narrow strip 3 to 6 miles wide lying west of the Little Colorado River. East of the river it is soon buried by more recent deposits.

In the summer of 1930 a new factor in the physiography of this area was recognized. Archeological evidences have accumulated which indicate that Sunset Crater was active in early Pueblo time. This eruption occurred between 600 and 850 A. D. In this eruption Sunset spread black basaltic sand over the land. In places near the crater this black sand lies over 2 feet deep. As we leave the region of the crater the layer thins out in every direction. Because of the prevailing westerly winds the sand layer thins out more rapidly to the west than to the east. Black sand is found over a sector which includes about half a circle with a radius of about 20 miles. The center of this circle is Sunset Crater. The area of black sand extends from the base of the San Francisco Peaks to the Little Colorado River and from Black Point to Padre Canyon. During the 1,200 years which have elapsed since the ash fall the winds have gathered the sand into dunes which, in the forested region, have been anchored by vegetation. On the windy steppes the sand has drifted into the canyons and on the lee side of outcrops of rock, leaving the table-lands free.

This sand cover no doubt influenced the agricultural use of the land, forming a mulch and conserving the moisture. It also must have absorbed most of the run-off and so influenced the springs. It is interesting to observe that the densely populated area in early Pueblo III coincided with the area covered by the ash. In the seven or eight hundred years elapsing since the region was densely populated, the high winds have removed the black sand cover and deposited it in the canyons, where much of it has been carried away into the Little

Colorado River. Be this as it may, the black sand is an important factor in the human occupancy of this region.

METHODS OF AN ARCHEOLOGICAL SURVEY

The methods adopted by the Museum of Northern Arizona to its archeological survey were developed by the author over a period of 14 years (1916–1930). As these methods are adaptable to small intensive surveys, it is important to record them.

Four archeological surveys are actually progressing in the Southwest: the Laboratory of Anthropology at Santa Fe under Dr. H. P. Mera, the University of New Mexico under Reginald G. Fisher (1929–30), Gila Pueblo under H. S. Gladwin (1928–30), and the archeological survey begun by the author and continued by the Museum of Northern Arizona. Each survey follows a different method and has a different scope.

The scope of the University of New Mexico, Laboratory of Anthropology, and Gila Pueblo surveys include the whole Southwest. On the other hand, that of the Museum of Northern Arizona is quite restricted. It is an intensive survey. Starting from Flagstaff as a center, an attempt is made to record all the sites in every direction radiating from that center, no matter how small and insignificant they may be. Its ultimate aim is to cover the whole northern portion of Arizona. Its immediate aim is to study the region between Flagstaff and the Hopi villages.

Of the vast area in our scheme this study is an insignificant part, but as it is the hub from which other studies arise, it is important. The region lying between the San Francisco Mountains and the Little Colorado River forms the substance of this portion of the project.

At Flagstaff the following methods are practiced in the field and then in the laboratory:

(A) In the field.

(1) When a site is discovered it is given a serial number which is painted in white paint on the smoothest rock or, if rocks are absent, tree trunk nearest the north side of the site. The letters N. A. precede the number, so that the initiated will know that it is a site recorded by the Museum or Northern Arizona. (Example: N. A. 1653.) Where trees and rocks are absent an oak stake branded with N. A. and stamped with the site number is driven.

(2) *a*. This number is now entered on the 3 by 5 inch survey card. (Fig. 1.)

b. If the site is well known and has a name that, too, is entered.

c. The Museum has divided northern Arizona into drainage areas of convenient size in the belief that the small drain-

(A) In the field—Continued.

age areas are cultural units, and that the final picture will be a mosaic built out of these small areas. At the same time the highlands between drainage areas are, in the semiarid west, relatively uninhabited because of the lack of water, and these become barriers to the cultural units. In this paper the following drainage units are studied: Little Colorado-Wupatki Basin, Little Colorado-Rodin Basin, Antelope Wash, Deadmans Wash, Rio de Flag, Upper Walnut Creek, and Lower Walnut Creek. The proper drainage is recorded on the card. In the laboratory the cards are filed according to the drainage area.

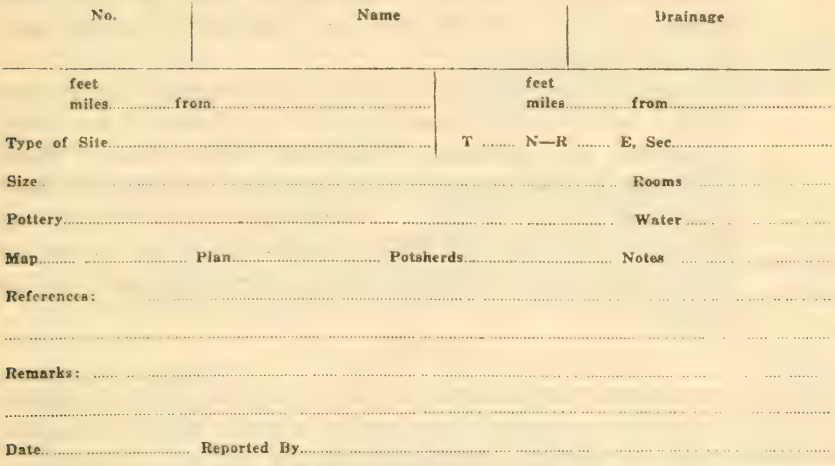


FIGURE 1.—Sample survey card

d. The distance and direction of the site along a line such as a road or a section line from some known point and the direction and distance from the road or section line.

e. Type of site, such as masonry, house, depression, sherd area, cave, fort, etc.

f. Approximate size by pacing and approximate number of rooms. On the back of the card a sketch plan of the ruin is drawn.

g. Location of permanent water supply.

h. The date and initials of the recorder.

(3) Into a paper bag a more or less random collection of potsherds is gathered. The method in use is to collect decorated sherds and then undecorated sherds and look for rare intruded pieces from other regions. The size of the collection varies with the size of the site. Since 1923 no attempt has been made to gather random collections.

(B) In the laboratory.

(1) The site is recorded by number in a special accession book.

(2) The site is recorded on a map. (Pl. 4.) The township is the unit.

(3) References to previous records on the sites are recorded on the card.

(4) The field card is filed according to drainage.

(5) A separate file of 8 by 11 inch folders is kept for those sites on which much data is had, such as photographs, plans, and notes. These are filed according to site number.

(6) The potsherds that were collected are now washed in water, then in hydrocholric acid, and dried. On each sherd the serial number of the site is written in India ink and shellacked, so that if sherds from two sites become mixed they are easily separated.

(7) The sherds are then placed in specially made cartons of standard sizes, 6 by 12 by 10 inches, 6 by 12 by 6 inches, 6 by 12 by 2½ inches, and cardboard boxes 6 by 10 by 1 inch. Each box bears a label giving the site number, drainage, pottery type, and special remarks. These boxes are arranged on shelves, which are 12 inches apart—the large boxes by themselves on the shelf and the smaller boxes and cartons stacked.

MAPS

In a survey, maps play a large part in the record. For this paper the maps have been compiled from several sources which have been combined with the direct observations of the author. Although a little more accurate than any existing maps, they are far from perfect.

The sources of the maps are as follows: The township plot of the General Land Office surveys extending from 1885 to 1919 (2 inches equal 1 mile), the excellent series of contour maps of the United States Forest Service, Coconino sheets, Nos. 2, 3, 4, 5, and 6 (scale 1 inch to the mile), United States Land Office map of Arizona (1 inch equals 12 miles), and the Geological Survey topographic map of the Flagstaff quadrangle (1 inch equals 2 miles). The author wishes to thank those Government bureaus, the Forest Service, the Geological Survey, and the General Land Office, for the use of these excellent series.

From the above sources a key map and two series of large-scale maps have been drafted. The key map shows the main features of the region, the auto roads, a few of the principal ruins, and the position of the large-scale maps. On the first series, comprising five sheets drawn originally 2 inches to a mile and reduced to three-fourths of an inch to a mile, most of the ruins have been plotted.

In the second series of four maps certain regions in which ruins are very abundant have been shown in still larger scales.

The ruins have been located on the maps by two methods. In a number of cases the section and quarter stones have been found and identified. This is particularly true on the terraces north and east of the San Francisco Peaks. In other places the ruins have been located by distance from a road, wash, or other important landmark, while in the settled districts the fence lines form a useful basis. Where no landmarks are near a few ruins have been located but approximately.

If a site is near a section boundary and the stone was not discovered, the ruin may have been placed in the wrong section. However, the average error is not over a quarter of a mile and probably considerably less.

The most important differences between these maps and the source maps are as follows: Walnut Canyon at the second fort has been corrected by a triangulation with a reflector compass. Drainage from Aztec Seep was found to enter Hulls Canyon. The contours of O'Neil Peak have been corrected.

A third series of maps comprises the house plans. These plans have been prepared by two methods. Where the house lines and room lines are not very distinct the distances were paced. When they are sharp and clear the distances have been measured by tape. But a few of the plans have been prepared for publication. The larger houses and those which show some special characteristic arrangement have been selected; hundreds of others are recorded on cards and in the files.

On the maps, the author has used those place names which he found on existing maps. However, these names are so few that he has been obliged to search for others. He has applied to the local inhabitants and when these have failed him, he has coined names. These new names usually are made from some local landmark.

One change has been made which diverges from the usage on some maps. The author considers that the Rio de Flag is a tributary of Walnut Creek and not that Walnut Creek is a tributary of the Rio de Flag. The Rio de Flag has no channel where it enters Walnut Creek and rarely ever flows, while Walnut Creek has a wide continuous bed in the region of the junction. In fact, if one follows the stream bed, the Rio de Flag could not be found. At the same time the name Walnut Creek should be substituted for San Francisco Wash.

On the maps the author adopted a series of symbols which seem to be suitable to this particular region. It must be understood that the interpretation of the ruins is not final, as few excavations were made.

It seems desirable to indicate on the maps the magnitude of the ruin. So the author on hypothetical grounds selected the following five or six types to be recorded. He assumed that a condition similar to that of the Hopi existed, that the married daughters tended to live

near their mothers. If, in times of peace and plenty, two daughters lived to marry, then we would have the following classification:

1 to 2 rooms..... A one-family house.
2 to 4 rooms..... A house occupied by a mother and one or two married daughters.
5 to 8 rooms..... A house occupied probably for three generations all in one family.
9 to 16 rooms..... A house occupied for four or five generations by one family or built by a congregation of several families or clans.

Pueblos are probably made up of the aggregation of several families. The larger pueblos were perhaps even composed of several clans.

The symbols for earth lodge and sherd area in most cases represent some kind of a pit house and nearly all belong to Pueblo II. The other symbols on the maps are self-explanatory or are made clear in the legend.

HOUSE TYPES

Eight types of structures have been recognized in the San Francisco Mountain area.

(1) The masonry dwellings from single-roomed houses of 1-story to 3-story pueblos with as many as 50 rooms. These may or may not be associated with a rectangular kiva.

(2) Small masonry dwellings constructed under natural overhanging rocks.

(3) Small masonry dwellings constructed in artificial caves excavated in volcanic ash under a lava flow—called cavate dwellings by Fewkes, 1896.

(4) Masonry forts in defensive positions on rims of canyons or on the tops of hills.

(5) Masonry granaries in the open—associated with earth lodges.

(6) Adobe or masonry granaries built in caves.

(7) Earth lodges. Rectangular pit house (Hargrave, 1930) with an entrance through the roof and a ventilator on the east side. Earth lodges include the vestibule house (Colton, 1920) with an alcove on the east side which is not an entrance. These may be (*a*) excavated in the ground (a rectangular pit house), (*b*) built on the surface of the ground, or (*c*) built on the top of a low mound. All three are varieties of a single type and belong to about the same period, no matter on what level the floor is placed. (The problem of the vestibule house will be considered in a paper in preparation.)

From a survey of the region it would seem probable that the rectangular kiva accompanies all ruins with which Tusayan or Little Colorado black-on-white pottery is found. It is usually represented by a depression on the east or southeast side of the building. In the large pueblos, such as Elden and New Caves, the kiva seems to be a

large room at ground level. In the small house sites the kiva has varied from 9 by 9 to about 12 by 16 feet. From the few excavations made it seems that the kiva contains a ventilator and deflector. (See Ruin No. 521, fig. 21.)

Ruin No. 887 furnishes a well-preserved kiva roof, a large pine timber 8 inches in diameter running across the middle of the room, and supports 3 to 4 inch pine timbers which are spaced about 4 to 6 inches apart. On these are laid a neat floor or split cedar shakes about 3 feet long. On this roofing lie bunches of grass and on top a layer of clay about 4 to 6 inches thick. Placing all of this together we have a fairly complete picture of the San Francisco Mountain kiva.

Mr. J. C. Clarke has reported an oval kiva buried in a sand dune near Heisers Spring. This may turn out to be a pit house when it is excavated. In the Citadel region are some evidences of oval kivas or pit houses—excavation alone will reveal their significance. However, whatever they are, they are rare.

POTSHERDS

When potsherds are studied from the sites in this area it will be seen that they fall into the types listed below. Where the types have been well studied they have been given names according to the method proposed at the Pecos Conference in 1927, a geographical name followed by a descriptive term. Types that have not been sufficiently well studied or whose center of development lies out of the area of this study and which have not yet been given a permanent name, are preceded by an asterisk (*).

(A) Wares with no decorative designs.

(1) **Plain gray ware.*—Granular surface due to coarse temper; throat of jar not coiled.

(2) *Rio-de-Flag brown.*—Plain red, brownish, and brownish-black ware, smooth surface, noncorrugated, tempering material coarse sand. Jars and bowls.

(3) *Deadman gray.*—Plain gray ware. Surface and paste gray, surface smooth, noncorrugated, tempering material contains fine mica. Jars and bowls.

(4) *Deadman fugitive red.*—Plain gray ware similar to the above in paste and surface, but with the surface painted with hematite after firing and not refired. The red paint will wash off with water. Jars.

(5) *Sunset red.*—Plain ware, grayish paste, temper black basaltic cinders, surface floated, red with blackish firing marks. In worn places the basaltic cinders show through the red. Bowls and jars.

(A) Wares with no decorative designs—Continued.

(6) *Flagstaff red.*—Plain ware, grayish paste, temper black basaltic cinders or sand. Exterior usually with a heavy float or slip of red with polishing marks or striation without definite foci. Interior of bowls polished a metallic black to deep gray. Interior of jars gray. The fact that this ware frequently has cinder temper and that the polishing marks are without definite foci distinguishes it from the Gila red ware of the Middle Gila (Gladwin, 1930). Jars and bowls. Called by Fewkes, 1927, Flagstaff ware.

(B) Wares with decorative designs.

(7) **Plain gray with a coil neck.*—Same paste and temper as No. 1. Sherds from the bottom of the jar can not be distinguished from bottom of No. 1 jar.

(8) **Gray corrugated.*—Exterior surface completely corrugated, coils indented. The many varieties have not yet been clearly distinguished. Mostly jars. (Pl. 2, (3) (4) (5) (6) (7).)

(9) **Gray corrugated.*—Coil partially obliterated. Mostly jars. (Pl. 2.)

(10) *Elden corrugated.*—Exterior surface may be red or yellow paste and basaltic temper similar to Flagstaff red. Corrugations quadrilateral in shape with rounded edges. Interior with or without a black metallic burnished surface. Bowls and small jars. Fewkes, 1927. Figure 219. (Pl. 2 (1) (2.)

(11) **Basket maker black-on-white.*—Black paint on a gray granular surface similar to Nos. 1 and 7. Coarse temper shows through the surface. Bowls and jars. (Pl. 1 (1).)

(12) **Pueblo I black-on-white.*—Paste similar to Nos. 1, 7, and 11. Interior of bowls or outside of jars floated and polished. On the polished white surface a black design is applied—fine lines, pendent dots, small triangles and stepped elements characterized by "marked crudity of brush work." Kidder, Southwestern Archaeology, p. 75, pl. 34. Bowls and jars. (Pl. 1 (2).)

(13) *Deadmans black-on-white.*—Gray paste, white polished slip on which a design of black broad lines, pendent dots, isolated dots, large triangles and squares. Exterior of bowls rough. Bowls and jars. (Pl. 1 (3).)

(14) *Deadmans black-on-gray.*—Gray paste, surface without a slip, similar to Nos. 3 and 4. Black design similar to No. 13 applied directly on the gray surface. Bowls and jars.

(B) Wares with decorative designs—Continued.

(15) *Walnut black-on-white corrugated.*—Gray paste, corrugated exterior, interior a white slip design similar to Deadmans black-on-white. Bowls.

(16) *Tusayan black-on-white.*—Gray paste, fine sand temper, float, or white slip, black designs of various geometric forms, that called "serations" being most characteristic. Same as Kidder Proto-Kayenta, Kidder, 1924. Bowls and jars. (Pl. 1 (4).)

(17) *Wupatki black-on-white.*—Thick ware, gray paste, coarse sand temper. White slip. Black design similar to Kayenta negative pattern. Probably a local attempt to reproduce Kayenta black-on-white. Exterior not finely finished. Bowls and jars. (Pl. 1 (5).)

(18) *Little Colorado black-on-white.*—Dark gray paste, coarse sand temper, white slip. Usually thicker than Tusayan black-on-white. For designs see Gladwin, 1930 (*a*), Plate 3. Jars and bowls. (Pl. 1 (6).)

(19) *Deadmans black-on-red.*—Gray paste, sand temper, red slip inside and outside, painted with a black design. Bowls and jars.

(20) **Black-on-white sherd temper.*—Gray paste, black design on white slip.

(21) *Tusayan black-on-red.*—Gray paste burning pinkish or yellowish on the surface, sherd temper, painted inside and outside in red on which a black design is applied. Bowls. There is a similar ware without the red paint found in Pueblo II sites in the Upper Moencopi Wash. On these the black is applied directly to the pink surface. This has not yet been given a name.

(22) *Tusayan polychrome.*—Called by Kidder 1924 Proto-Kayenta polychrome. A variety of Tusayan black-on-red. Gray paste burning yellowish on the surface, sherd temper. On the yellowish surface a red design is outlined in black. On the yellowish exterior of bowls a broad red line is drawn below the rim. Bowls.

(23) *Kayenta polychrome.*—Paste and yellowish slip or float similar to Tusayan polychrome. Red is used on large masses. The black is outlined with a narrow white line. On bowls the exterior contains a broad red line as in the Tusayan polychrome. See Kidder, 1924. Bowls and small jars.

(24) In the late sites other wares manufactured in neighboring regions are sometimes encountered, such as Jeddito black-on-white, Kayenta black-on-white, Klag-E-to black-on-yellow, and Little Colorado polychrome.

CULTURE HORIZONS

The Southwestern Archeological Conference, held at Pecos, N. Mex., in 1927 (Kidder, 1927), proposed the following chronological classification of culture periods in the Southwest.

BASKET MAKER I, or Early Basket Maker.—A postulated (and perhaps recently discovered) stage, preagricultural, yet adumbrating later developments.

BASKET MAKER II, or Basket Maker.—The agricultural, atlatl-nonpottery-making stage, as described in many publications.

BASKET MAKER III, or Late Basket Maker, or Post Basket Maker.—The pit or slab house building, potter-making stage. (The three Basket Maker stages were characterized by a long-headed population, which did not practice skull deformation.)

PUEBLO I, or Proto-Pueblo.—The first stage during which cranial deformation was practiced, vessel neck corrugation was introduced, and villages composed of rectangular living rooms of true masonry were developed. (It was generally agreed that the term pre-Pueblo, hitherto sometimes applied to this period, should be discontinued.)

PUEBLO II.—The stage marked by widespread geographical extension of life in small villages; corrugation, often of elaborate technique, extended over the whole surface of cooking vessels.

PUEBLO III, or Great Period.—The stage of large communities, great development of the arts, and growth of intensive local specialization.

PUEBLO IV, or Proto-Historic.—The stage characterized by contraction of area occupied; by the gradual disappearance of corrugated wares; and, in general, by decline from the preceding cultural peak.

PUEBLO V, or Historic.—The period from 1600 A. D. to the present.

Since the Pecos Classification was published the pottery types associated with the culture periods in the central area have become more distinct. In the San Francisco Mountains culture periods correlate with house types and pottery types as follows:

BASKET MAKER I and BASKET MAKER II have not been distinguished in the area covered by this paper.

BASKET MAKER III is but poorly represented, three sites only being recorded.

House type.—An earth lodge, rectangular pit house. Hargrave (1930).

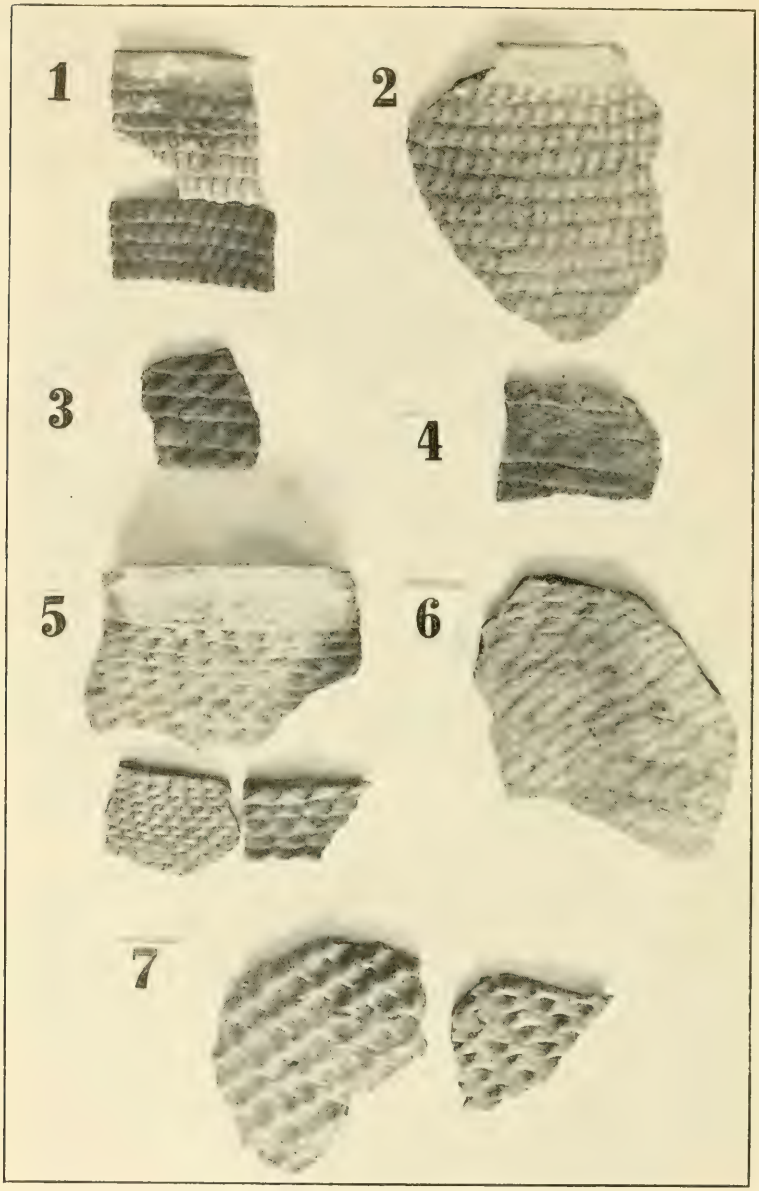
Pottery.—Plain gray, Basket Maker black-on-white.

PUEBLO I is poorly represented; all the known sites lie east of Flagstaff among the cinder hills.

House types.—An earth lodge, a rectangular pit house. Hargrave (1930).

BLACK ON WHITE POTSHERDS

1, Basket Maker III black on white; 2, Pueblo I black on white; 3, Deadmans black on white, index for Pueblo II; 4, Tusayan black on white, index for Pueblo III, north of the San Francisco Peaks; 5, Little Colorado black on white, index for Pueblo III, south of the San Francisco Peaks; 6, Wupatki black on white, index for late Pueblo III (1250–1300). This type is similar to Kayenta black on white but not so thin nor so well finished.



CHARACTERISTIC CORRUGATED POTSHERDS

1, 2, Elden corrugated, Pueblo III, south of the San Francisco Peaks; 3 and 5, Pueblo III corrugated, Pueblo III, north of the San Francisco Peaks; 4 and 6, partially obliterated corrugated, late Pueblo II and early Pueblo III; 7, corrugated, Pueblo II.

Pottery.—Plain gray, plain gray with a neck coil, Pueblo I black-on-white, Rio de Flag brown.

PUEBLO II is very abundant everywhere.

House types.—(1) Earth lodge, a rectangular pit. Hargrave (1930). (2) Earth lodge of the vestibule type, Colton (1920), under the ground, on the ground, or where the snowfall is heavy and the soil clayey, on the top of a mound. (3) Masonry granaries. (4) Masonry forts.

Pottery.—(1) Drainage of Deadmans Wash, Antelope Wash: Deadmans gray, Deadmans fugitive red, Deadmans black-on-white, Deadmans black-on-gray, Deadmans black-on-red, gray corrugated. On late sites Tusayan black-on-red is found.

(2) Drainage of the Rio de Flag and Walnut Creek: Rio de Flag brown, Sunset red, Deadmans black-on-white, Walnut black-on-white corrugated, Gray corrugated, Deadmans black-on-red.

PUEBLO III.—Includes most of the sites recorded on the maps. Everywhere abundant except close to the San Francisco Peaks.

House types.—Two-room to forty-room masonry pueblo. Usually with a rectangular kiva on the east or southeast side.

Pottery.—(1) Deadmans and Antelope drainage and Little Colorado, Wupatki, and Rodin basins. Gray corrugated, often partially obliterated, Tusayan black-on-white, Tusayan black-on-red, Tusayan polychrome, and in the late pueblos Wupatki black-on-white and Kayenta polychrome are added to the others.

(2) Rio de Flag and Walnut Creek: Gray corrugated, partially obliterated; Tusayan black-on-white; Little Colorado black-on-white; Tusayan black-on-red; Tusayan polychrome; Flagstaff red; Elden red corrugated; and Sunset red. At late sites Wupatki black-on-white, Kayenta polychrome, Little Colorado polychrome, Klag-E-to black on yellow, and Proto-Four-mile polychrome are met with.

PUEBLO IV AND V are not represented in this region, although three sites were occupied up to the transition into Pueblo IV: Wupatki, Old Caves, and Turkey Hill.

GEOGRAPHIC DISTRIBUTION OF CULTURES

The method of studying the distribution of pottery differs from other similar studies. Fewkes (1904) counted the number of pieces, presumably whole bowls and jars, of each type collected from a series of sites, and has presented us with a pottery cross section of Arizona, 70 miles east of the Flagstaff region; Kidder (1917) at Pecos and Nelson (1916) in the Gallesteo Basin and Gladwin (1930) have each studied pottery complexes by counting potsherds and expressing the results in percentages. The author feels that this method can be improved upon, because some kinds of pottery are more fragile than others; at least this is true in the San Francisco Mountain region where the coarse brown and red ware is frequently found in

smaller fragments than the black-and-white ware. For this reason the author weighs the sorted potsherds from a given site rather than counts them.

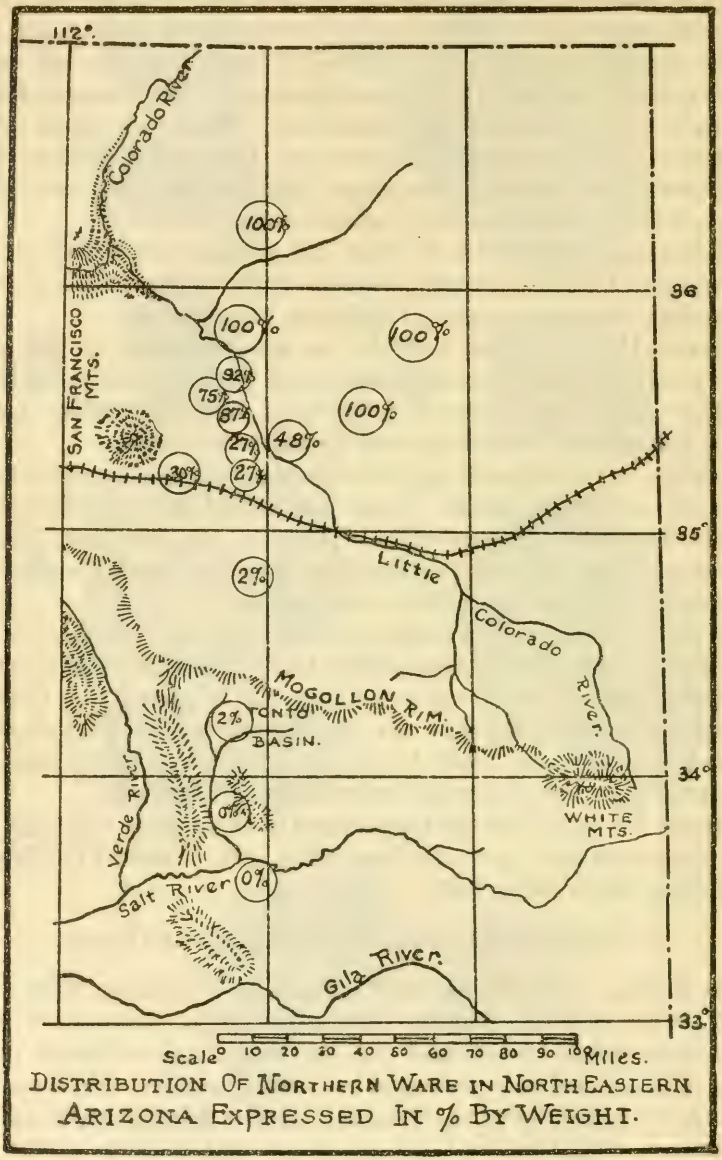


FIGURE 2.—Distribution of black on white and corrugated wares in northeastern Arizona

The method followed was to collect every potsherd, and then weigh the piles. The results expressed in percentage form the basis of Figures 2 and 3.

Pottery studies reveal that in Pueblo II and in Pueblo III two cultures existed in the San Francisco Mountains. The sites on Walnut Creek drainage have a different complex from those in the

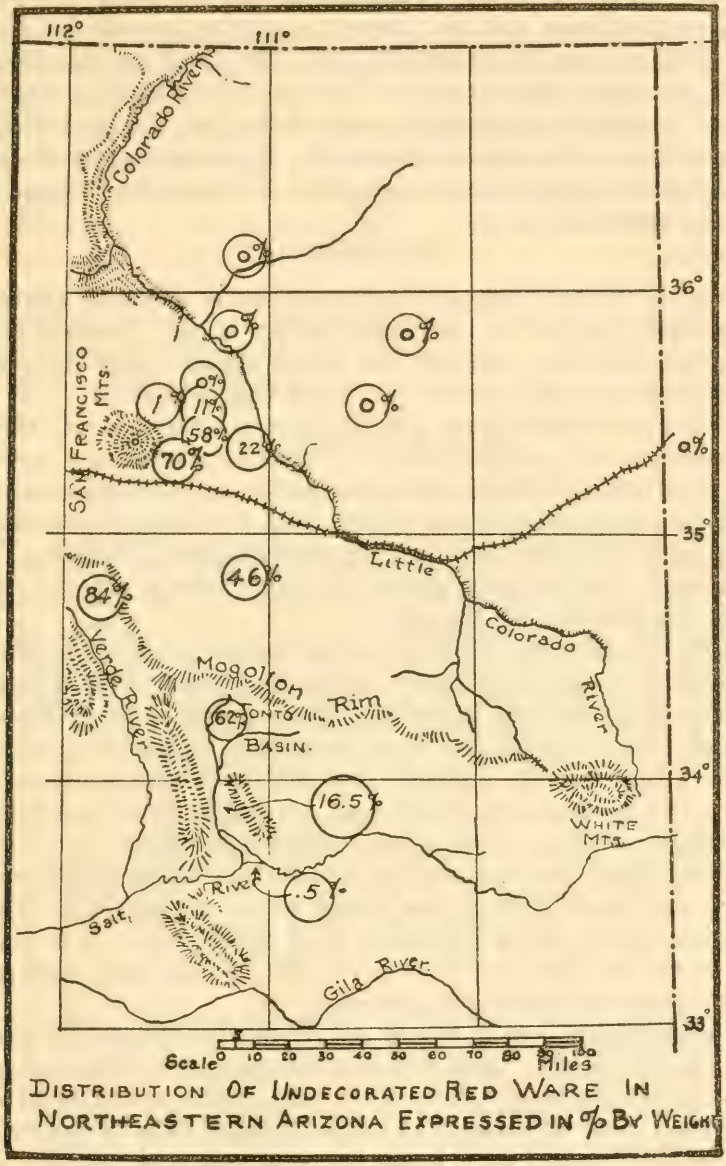


FIGURE 3.—Distribution of undecorated red wares in northeastern Arizona

Deadmans Wash drainage. A line running east from the main peaks in the region of the Coconino Divide to the Little Colorado seems to have been a barrier or a frontier between Walnut Creek and Dead-

mans Wash complexes. In Upper Rio de Flag and Upper Deadmans Wash the sites are nearly all Pueblo II. Pueblo III is absent, but in the upper Rio de Flag, Rio de Flag brown is the utility ware, while in Upper Deadman it is Deadmans gray or Deadmans fugitive red. In lower Deadmans and the Lower Rio de Flag, Pueblo III sites are more striking than the Pueblo II sites. South of the line Flagstaff red is dominant, while north of the line it is absent, or nearly so. Little Colorado black-on-white south of the line, Tusayan black-on-white is the common one to the north. It is hard to see what kind of a barrier existed which prevented the mixing of two tribes, but it was an important one.

AGRICULTURE

From the survey it appears that the eruption of Sunset Crater was a dominant incident in the history of our area. Previous to that event the sites were clustered close to the peaks. After the eruption they spread from the peaks to the Little Colorado River.

For primitive agriculture a light soil is necessary, a soil that can be penetrated by a digging stick. Therefore we find the early sites associated with alluvial parks in the forest and old intercone basins. After the eruption of Sunset Crater, with the country covered with a thin layer of black sand, a new era for agriculture developed. This black sand absorbed heat and at the same time acted as a mulch, conserving the water in the soil.

At the present time the Hopi selects for his cornfields a thin sand dune which is traveling slowly across the land. With his digging stick he plants the seed in the soil, which is kept moist by the mulch of sand, a foot to 18 inches deep, depending on the thickness of the mulch. It is thought probable that the black sand made a similar mulch and that an area which had previously been unsuitable for agriculture became a garden spot. Because the sand cover washed and blew away, the late pueblos, like Elden, Turkey Hills, and Old Caves, are found close to the peaks, while the people of Wupatki cultivated the dunes in the shelter of an escarpment. Now that the sand cover has been largely removed the land has gone back to the grassy steepe that originally existed.

In many places lines of stones are visible which mark the position of the ancient fields. Lines of stones dammed little draws and caught the sand and moisture, as we see to-day at the second Hopi Mesa. (See wash west of Crack-in-Rock.) Parallel lines of stones were used as windbreaks, such as can be seen to-day at Sikyatki at the First Hopi Mesa (or in this region southeast of Ruin 377, or South of Grand Falls).

Broken hoes are picked up on the site of the fields and a digging stick has been found in one excavation.

Methods of agriculture as far as we can see were similar to the methods used to-day by the Hopi.

WATER SUPPLY

The rainfall ranges between 40 inches on the mountains (Pearson, 1921) and 25 inches at the base, and from 5 to 10 inches by the river (Monthly Weather Review). In the region suitable for agriculture the rainfall is between 15 and 25 inches. The porous nature of the soil renders this water unavailable for domestic purposes except when caught in basins in lava canyons or when it appears in springs in the Moencopi sandstone and shales. Certain clay basins will also hold temporary pools. The distribution of the ruins is largely a matter of water supply. Water is scarce over the entire area, notwithstanding the fact that the rainfall would support running streams if the region had a different geological structure. The author accepts the doctrine of climate change to account for ruins in now waterless regions.

DESCRIPTION OF SITES

Upper Rio de Flag and about Elden Spring

North of Flagstaff the Rio de Flag has its sources on the southern flanks of the San Francisco Mountains. Although petroglyphs abound at the old Veit ranch on Mount Agassiz, altitude 8,100 feet, the highest dwellings occur lower at Little Le Roux Spring (Cliff shelter), altitude 7,600 feet. In this region north of Flagstaff the most notable group of ruins lies a few hundred yards north of the Flagstaff reservoir on the Schultz Pass road. These furnish the best examples of earth lodges (Colton, 1920) which had been built upon a platform or mound. The remains of other earth lodges fringe the base of the mountains east to Elden Spring. In this region no houses were built; the notable group west of Elden Spring in the pines described and figured by Colton (1918 *a*, *b*), were probably platforms on which earth lodges had been built and 125 beside National Highway a mile south of Elden Spring (Colton, 1918), may be a similar platform.

Mr. L. F. Brady, of the Mesa School, discovered pottery fragments 14 feet below the surface of the earth in the walls of the arroyo of the Rio de Flag associated with the stumps of buried trees. The author aided him in digging out a pit-house site 4 feet below the present level of the alfalfa field of the county farm. The details of this work are left to Mr. Brady to record.

North of Flagstaff the characteristic dwelling is the earth lodge on a platform while the characteristic potsherd of the dwellers is Rio de Flag brown.

Walnut Canyon

Among the antiquities of the Flagstaff region the cliff dwellings in Walnut Canyon are best known. Not only have they been longest exploited, but also they are more frequently visited than any of the antiquities of the region, being examined yearly by over 10,000 people. (Map, pl. 3.) In 1906, to preserve the ruins, the President set aside as a National Monument two sections and a quarter inclosing the most conspicuous remains. Being within 6 miles of the transcontinental highway (U. S. No. 66), it is one of the most readily accessible national monuments to the automobile tourist. Because of this accessibility and the large number of visitors to the canyon, an account of it is necessary.

It can not be said that Walnut Creek rises, because it rarely has any water flowing in it. Yet it drains a very large area lying between the San Francisco Peaks and Mormon Mountain 40 miles to the south. The waters from an occasional cloud-burst in the summer or the melting snows in the spring flow north from the region about Mormon Mountain, down Clark Valley, past Lake Mary to Fishers Tank. For many miles a cliff or escarpment rises abruptly 200 or 300 feet above its eastern banks. This cliff, a fault escarpment, forms the western edge of Anderson Mesa. At Fishers Tank the channel turns east, slicing through Anderson Mesa, cutting a rocky canyon in the Kaibab limestone and underlying Coconino sandstone 300 to 400 feet deep; and follows a meandering course eastward with many sharp hairpin bends, its alternately sandy and boulder-strewn bed opening out finally into a shallow channel near Winona Station on the Santa Fe Railroad.

Halfway between Fishers Tank and Winona Station the ancient people of the region congregated in a village. Tilling the ground in the parks to the northeast, they found water, shelter, and security in the canyon. Water, the primal necessity, exists in several places in natural pools and probably can be found by digging in the sand in other places. The unequal weathering of the sandy Kaibab limestone forms natural overhangs with flat floors. Taking advantage of the overhanging ledges, side and front walls are the only structures needed to complete a house. Security can be found on the almost inaccessible "islands" and peninsulas which occur at nearly every sharp bend in the canyon.

In occupying the sunny north walls of the canyon, the bitter cold of the winter was ameliorated, and shelter from the irritating winds of the spring and early summer attained. Except for the chore of carrying water up the well-built trail from the pools in the canyon, Walnut Canyon must have been a pleasant place in which to live.

The first fort or "Steamboat Fort" lies 3½ miles southwest of Winona Station up the canyon. (Map, fig. 9.) Here the canyon

is shallow, about 100 feet deep. Houses crowd the top of a peninsula, the perpendicular walls of which form an adequate defense. Other houses occupy the promontories on the canyon wall, while the wide flats on the canyon floor contain foundations grouped about a large corral-like inclosure. At the base of the fort on the west side of the "island" a kiva seems to have been built. The first fort would form a good place for investigation.

The second fort, 3 miles above the first fort and a mile above the Santa Fe Railroad dam, is not so favorable for study. Here the canyon is deeper and the remains of habitation fewer. Evidences of long occupation are not present. About the first fort the inhabitants lived in houses on the surface of the ground. At the second fort they occupied houses built under overhanging ledges. The second fort presents few points of interest, notwithstanding its picturesque situation at the junction of a large tributary canyon with Walnut Canyon.

Within the National Monument, a third fort similar to those previously described occupies a peninsula jutting out from the northern rim of the canyon, and is surrounded by one of the frequent hairpin curves of Walnut Creek. Here the canyon is exceedingly narrow as well as deep. Nevertheless the third fort, called popularly the "island," lies in the thickest settled portion of the canyon. It is the one "island" easily accessible and frequented by the tourist. The sides of the "island" are covered with cliff dwellings and the top crowned with a fort where traces of the defensive walls still remain.

The fourth fort occupies the end of a peninsula jutting out from the south wall a quarter of a mile above the third fort. While the southern face is covered by dwellings, the northern face, supporting a growth of balsam, Douglas fir, and other members of the Canadian floral zone, is without many houses. The fort is defended by a wall across the neck of the promontory. A mile above the fourth fort lies the fifth fort. This is a peninsula or "island" joined to the southern wall. Both the east and west exposures of the "island" contain dwellings. However, like the second fort, it never formed the refuge for a teeming population. Farther up the canyon peninsulas and promontories abound, but they were not used by the primitive inhabitants of the region as places for defense. This may be because the cornfields were too far away; other places just as easily defended lie nearer the arable gounds.

The ruins about Walnut Canyon fall in four groups: (1) Small one or two roomed houses on and back from the canyon rim, a quarter of a mile or so, or on the islands or peninsulas in the canyon, (2) three or five roomed houses similarly located, (3) cliff dwellings, and (4) forts.

The positions of the dwellings on the level ground are shown on the map and are not different from others in the region. The group on the promontory in the eastern part of the National Monument (Nos. 108, 385, 386, 475, 476) is perhaps the most interesting and

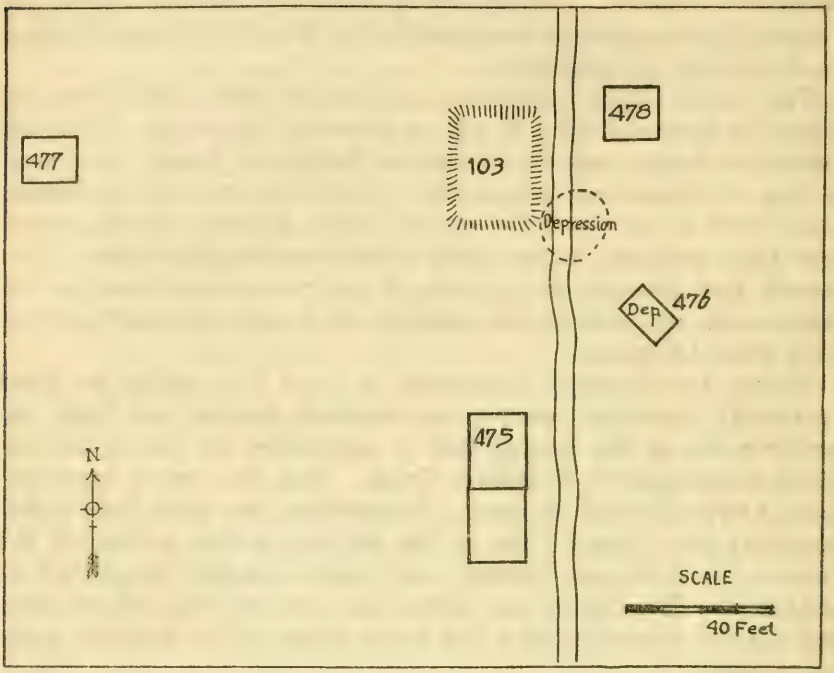


FIGURE 4.—Walnut Canyon—Group of houses on the north rim (103, 475, 476, 477)

deserves the most study. (Figs. 4 and 5.) Notwithstanding dozens of houses on the level ground, the characteristic dwelling in Walnut Canyon is the cliff shelter. (Figs. 6–8.) Whereas, the Coconino sandstone at the bottom of the canyon forms, almost everywhere, except where crushed in faulting, a precipitous wall, the overlying hard Kaibab limestone weathers characteristically in a series of steps. Three relatively soft layers are overlaid by a hard layer. The weathering of the three soft layers has resulted in a series of three ledges with overhanging roofs. Here on each tier the people of the region built rooms, one after another in a single line; but in two places they added an outer series of rooms (fig. 7). Although the overhanging rock made a roof unnecessary for the inner rooms, the outer rooms entirely beyond the overhang required a constructed roof.

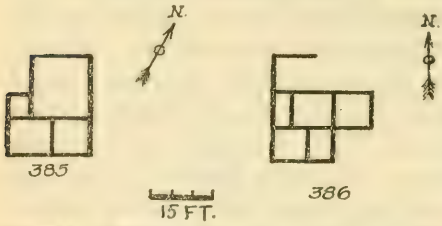
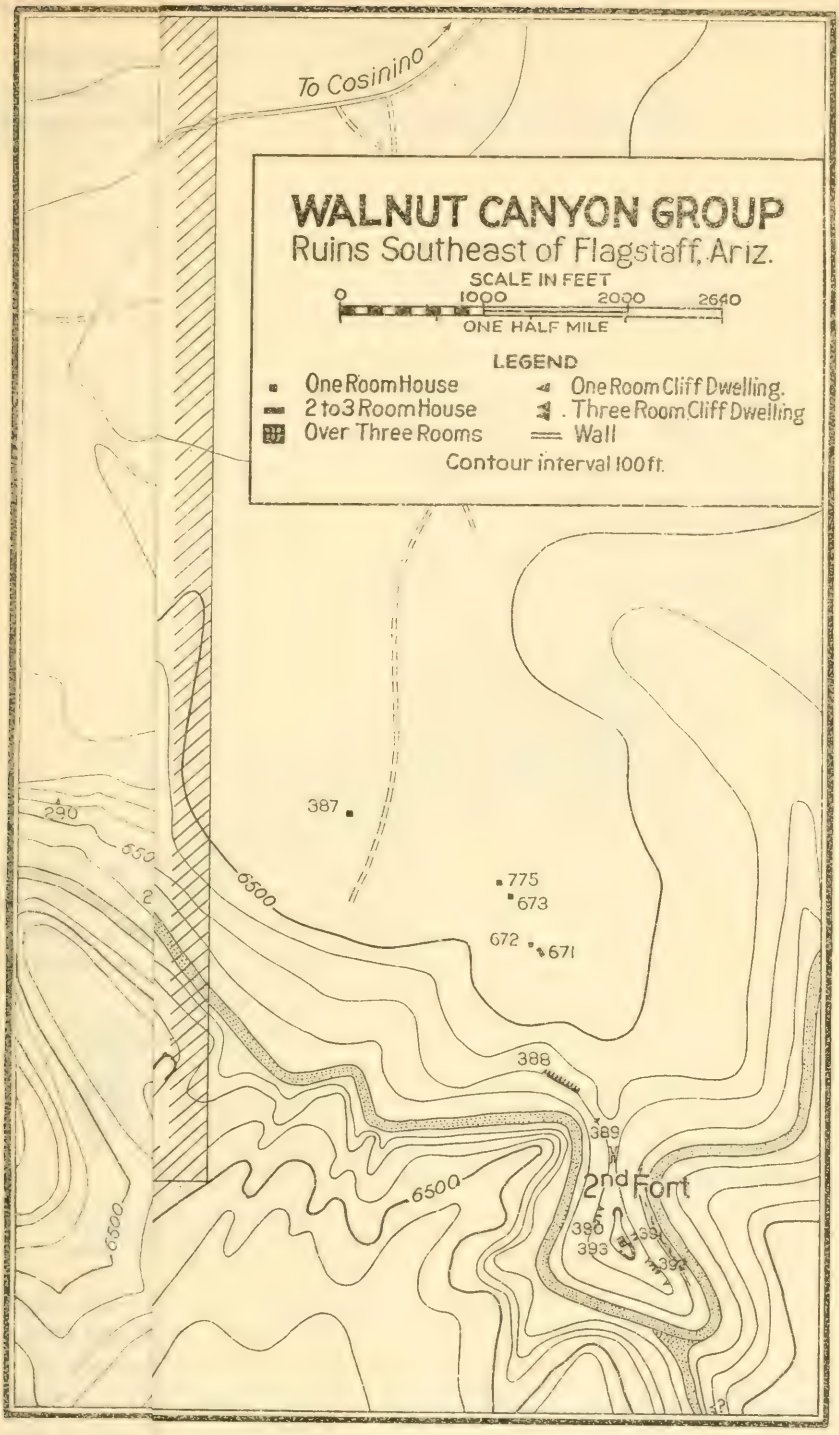
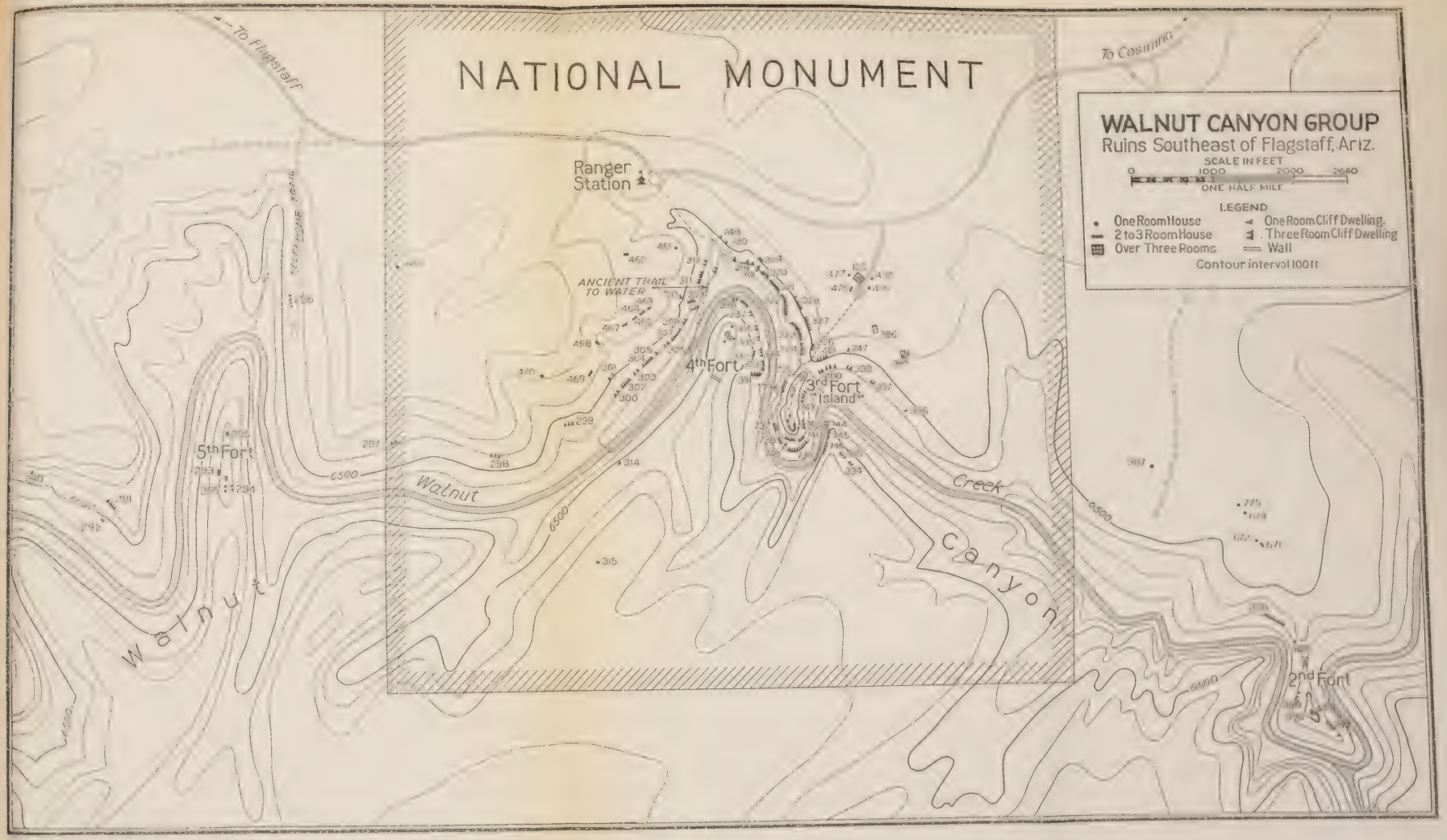


FIGURE 5.—Walnut Canyon—Group of houses on the north rim (385, 386)


To Cosinino
WALNUT CANYON GROUP
Ruins Southeast of Flagstaff, Ariz.
SCALE IN FEET
0
1000
2000
2640
ONE HALF MILE
LEGEND
One Room House
2 to 3 Room House
Over Three Rooms
One Room Cliff Dwelling.
Three Room Cliff Dwelling
Wall
Contour interval 100 ft.
387
290
650
6500
775
673
672
671
388
389
2nd Fort
390
393
6500
6500


NATIONAL MONUMENT
To Flagstaff
To Cosnino
Ranger Station
ANCIENT TRAIL TO WATER
4th Fort
3rd Fort
Island
5th Fort
2nd Fort
Walnut
Creek
Canyon
6500
6400
WALNUT CANYON GROUP
Ruins Southeast of Flagstaff, Ariz.
SCALE IN FEET
0 1000 2000 2640
ONE HALF MILE
LEGEND
One Room House
2 to 3 Room House
Over Three Rooms
One Room Cliff Dwelling
Three Room Cliff Dwelling
Wall
Contour interval 100 ft

The construction of the partitions is peculiar. The partition walls were built and completed before the end walls were started, so that the end walls were not tied to the partitions walls. Having nothing

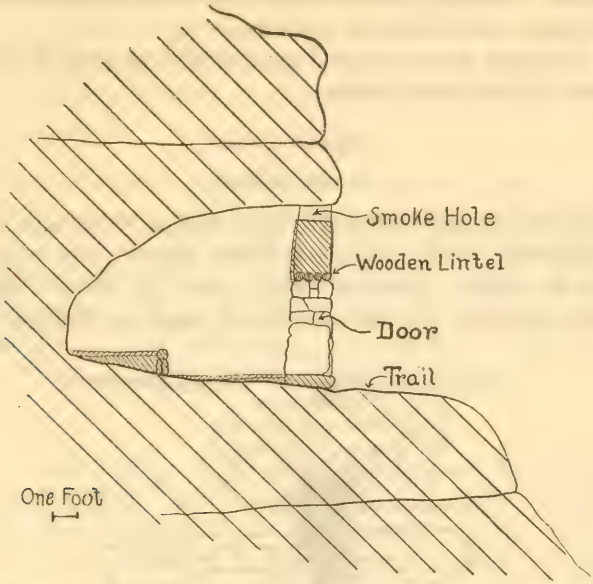


FIGURE 6.—Walnut Canyon—Generalized section of a cliff house based particularly on house 746. This section illustrates the way the dwellers in the canyon made use of the overhanging limestone rocks; how the walls were constructed and the floors leveled

to hold them when rain water undermined them, they fell. This accounts for the almost universal absence of complete front walls.

Since a large population once lived in this region, it is a striking fact that no trace of a kiva has been found except at the first fort far

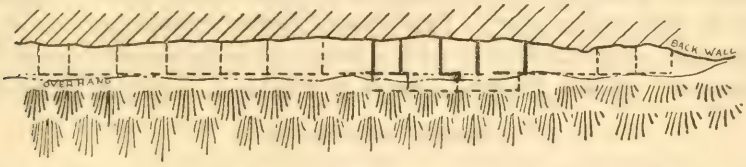


FIGURE 7.—Plan of house 322 which was built under an overhanging ledge of limestone. Three rooms extended beyond the line of overhang, which must have had constructed roofs. No. 322 would be a good site to restore

down the canyon. Where the ruins are thickest nothing suggesting a kiva has been observed.

As the canyon is visited by so many people yearly, the author suggests that the present trail be closed, that Casa 103 be reconstructed into a custodian's house and local museum and Casa 475, which contains two good-sized rooms, be restored. He also suggests that a

trail be built from the end of the promontory opposite the "island" down to the level of the middle series of cliff dwellings. At this level a portion of cliff dwelling No. 322 should be restored. With these changes made, Walnut Canyon will be a much more interesting and instructive place for itinerant tourists.

Walnut Canyon was occupied principally in late Pueblo II and early Pueblo III cultural strata.

Doney Park

ELDEN PUEBLO

On the divide joining Sheep Hill with Elden Mountain, west of the National Highway, in the pines, lies Elden Pueblo, No. 142, excavated by Fewkes in 1926. (Fewkes, 1927, plan, p. 210.) This Pueblo, like several others in the neighborhood, such as Turkey Hills, was

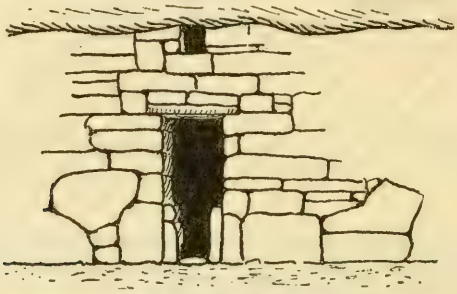


FIGURE 8.—Details of door and smoke hole of house 746, one of the cliff dwellings in Walnut Canyon

located with little thought of defense. Of the main building Doctor Fewkes excavated 33 rooms, leaving about 16 rooms unexcavated, so the building contained about 49 rooms on the ground floor. About the central building are the remains of three small 1-story houses of three to five rooms each. The kiva of Elden Pueblo proved to be a large room at ground level with a low seat or banquette around the inside wall. Elden Pueblo belongs to Pueblo III culture horizon.

TURKEY HILLS PUEBLO

Among the larger pueblos of this region mention must be made of one (No. 660) lying a quarter mile south of the Winslow Road on the lower flats of the Turkey Hills. A large mound which might cover the remains of a 3-story building with perhaps 15 basal rooms has a 1-story extension of 11 rooms extending northeast. Three small 1 to 4 roomed houses lie a few yards to the southeast. Between the largest of these, a house with 4 rooms, lies a depression which excavation might show to be a kiva. An outcrop of lava north of the ruin was used as permanent metates for grinding corn.

Although not as large as Elden Pueblo, this ruin is one of the larger ones on the level ground. Being near the present settled district of Doney Park, it is subject to vandalism and it is reported that some stone has already been removed for building purposes. In the summer of 1928 Dr. Byron Cummings, with the aid of his students, began the excavation of this ruin. Culture horizon is Pueblo III. Potsherds show that this site was occupied later than Elden Pueblo.

WINONA ROAD GROUP

Near Locketts Tanks, east of Doney Park on a lava flow, stood a group of small houses described by Colton (1918 *a*, *b*). This group has been destroyed by the location of the new National Highway, which has passed through the main house of the group. It furnished a very good example of the small house ruin of the region, a house not very different from that described by Prudden (1920) in the San Juan region, Pueblo III.

OLD CAVES PUEBLO

The Old Caves Pueblo (No. 72), plastered on the sunny south slope of a small cinder cone, overlooks Doney Park. Fewkes (1900 and 1904) has described it well and figured some of the curious underground rooms beneath each house. The plan (fig. 10) shows the number of rooms and also records the rooms with undergorund chambers. Since this pueblo is unique in pueblo architecture, it should be preserved from the pot hunters, who are mining in its burial grounds. This hilltop should be a National Monument. The culture horizon is late Pueblo III and very similar to Turkey Hill.

PICTURE CANYON AND PORCUPINE CAVE

East of Cliffs Station the Rio de Flag crosses north of the track and enters a lava canyon. In this canyon lies a natural tank. Northeast of the tank a series of small houses of early Pueblo III cluster at the canyon rim, while other house sites are formed in the talus under the lava cliff. (Map, fig. 9.) In one place the primitive inhabitants mined the loose lapilli and scoria from under the lava flow, forming a series of four chambers called locally Porcupine Cave. The last chamber still is separated by a stone and adobe wall from the third chamber. This wall is punctured by a doorway with a wooden lintel still in place. The wall is neatly plastered. (Since this was written in 1923, vandals have destroyed all the walls.)

In 1919 the author excavated a number of graves in the talus east of the cave, recovering a number of artifacts, and in 1921 he excavated a rectangular chamber in the talus which may or may not have been a kiva. Here nothing notable was found but the fireplace and a cache of five stone axheads.

Picture Canyon (fig. 11) was named for the large number of petroglyphs which cover the basalt rocks; indeed, a notable array. It is a typical site of the people who made the Flagstaff red pottery. Nearly all the bowls recovered were of that type. However, a few pieces of Little Colorado black-on-white and corrugated ware were recovered from the burials. These burials, under the ledges of basalt beneath the sites of the houses, were as follows:

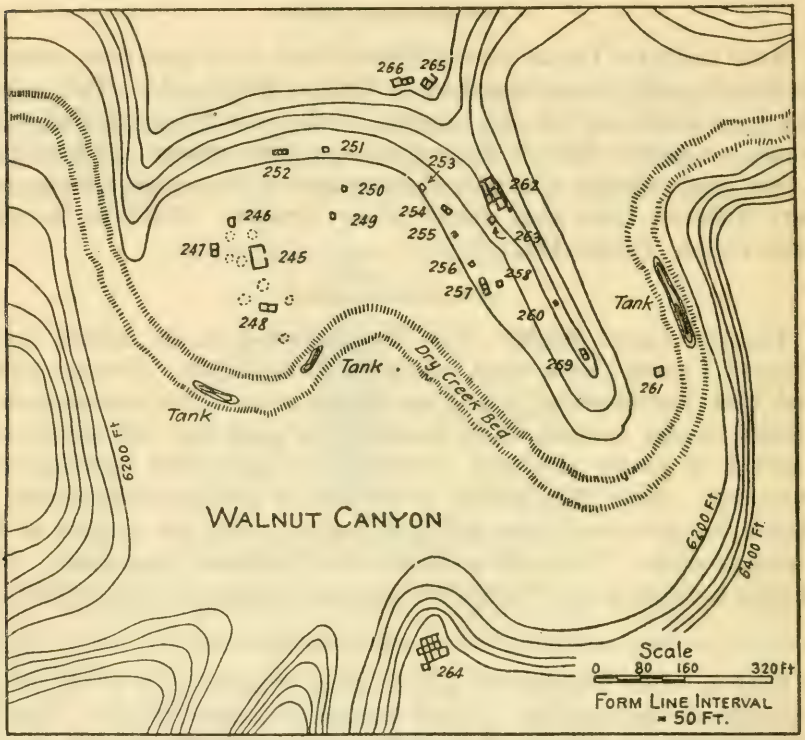


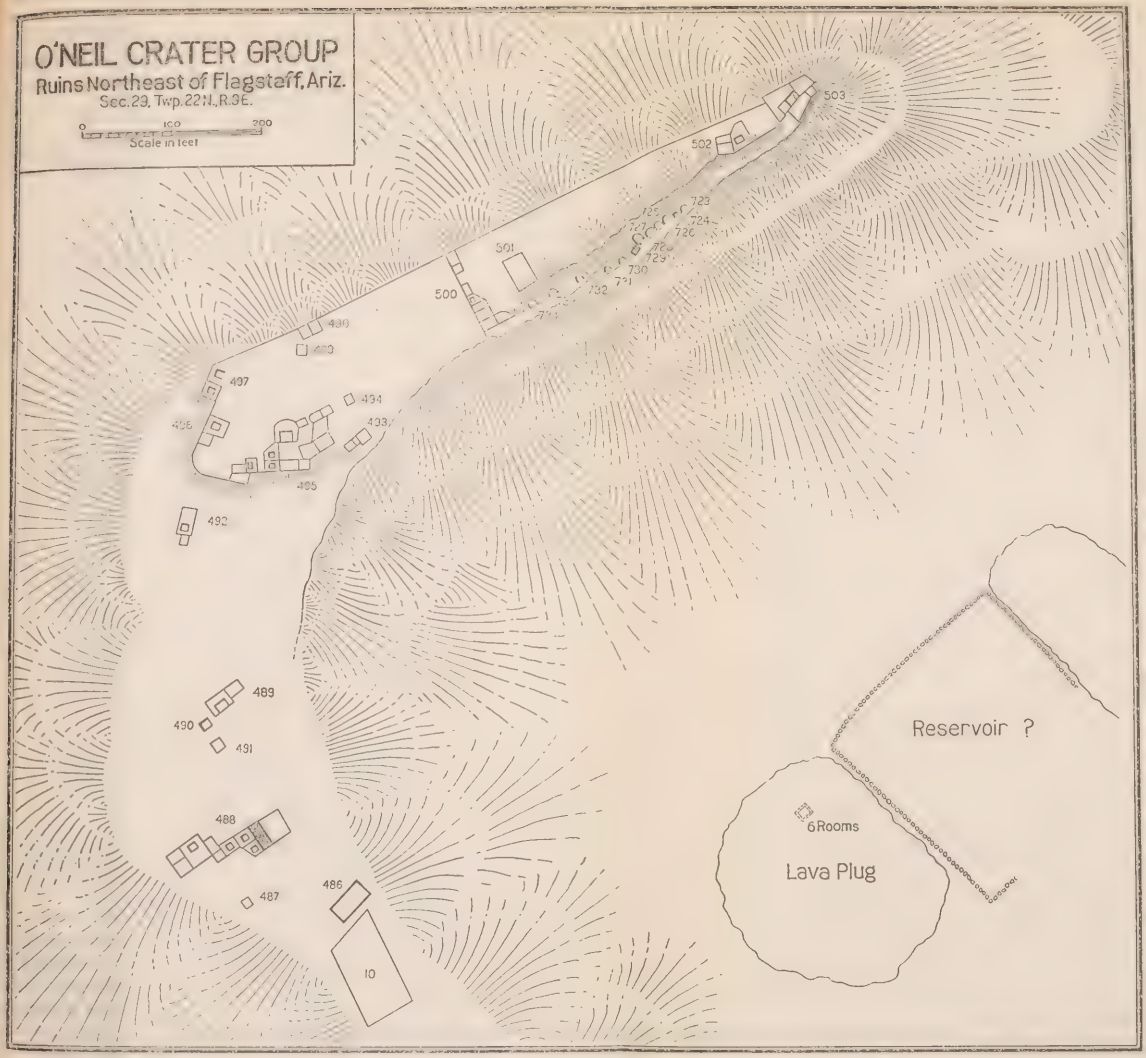
FIGURE 9.—First Fort in Walnut Canyon. Masonry houses are found on the canyon rim while pit houses cover the bench on the canyon floor

(*a*) Male, adult, artifacts, nine bowls of Flagstaff red ware, ladle, shell earring, and a disturbed primary burial (227).

(*b*) Child aged about 3, artifacts. Small olla, small bowl, black-on-white, Arca shell, bottom of small Elden corrugated bowl and blue pigment, and a disturbed primary burial.

(*c*) Child (age not determined), artifacts, small bowl, small olla of black-on-white, Arca shell, bottom of small Elden corrugated bowl and a disturbed primary burial.

(*d*) Child 6 years, lower jaw only, artifacts, small corrugated jar containing the bones of three ground squirrels, 3 ladles, 4 small bowls of Flagstaff red.


O'NEIL CRATER GROUP
Ruins Northeast of Flagstaff, Ariz.
Sec. 23, Twp. 22 N., R. 9 E.
0
100
200
Scale in feet
503
502
501
500
723
724
726
730
731
732
497
496
434
433
495
492
489
490
491
488
487
486
10
Reservoir ?
6 Rooms
Lava Plug

(*e*) Child encased in clay, age not determined, artifacts, 2 bowls of Flagstaff red ware, sherds of a Tusayan black-on-white bowl.

Gourd Flat

THE ACROPOLIS OF "RED" OR "O'NEIL" PEAK—NEW CAVES

North of the ranches in Gourd Flat rises the red rim of a ragged crater. This rim is low on the east side but rises 300 feet on the west.

FIGURE 10.—Old Caves Pueblo (72). A communal house straggling down the southern slope of a small cinder cone. It occupies the most convenient point near Doney Park suitable for defense. The curious underground chambers in nearly every room hollowed out of the cinders make it unique in pueblo architecture

Crowning the rim, a fringe of ruins with a few gaps enclose the crater. While the ruins on the east and the south rim are interesting, those on the west and north rim are remarkable. Fewkes (1904) commented on the ragged and inhospitable lava slopes that the inhabitants chose as dwelling places. He described a few of the cavate rooms on the face of the crater, but left us without a picture of the whole.

The acropolis of Red Peak (map, pl. 4) covers the northwestern portion of the crater rim, while detached houses of 1, 2, and even 11 rooms straggle down the hill to a saddle which had been leveled off perhaps as a dance court as suggested by Powell (1891). Fewkes (1904) interpreted it as a reservoir. On the terraces at the south foot of the mountain lie other houses. (See Colton 1918 *b*.)

The inner face of the crater falls steeply away, in places precipitous, while the outer slope is more gradual. The inner face, therefore, could be easily defended, short intervals of wall being all that is necessary. To protect the gradual outer slope, an extensive wall was

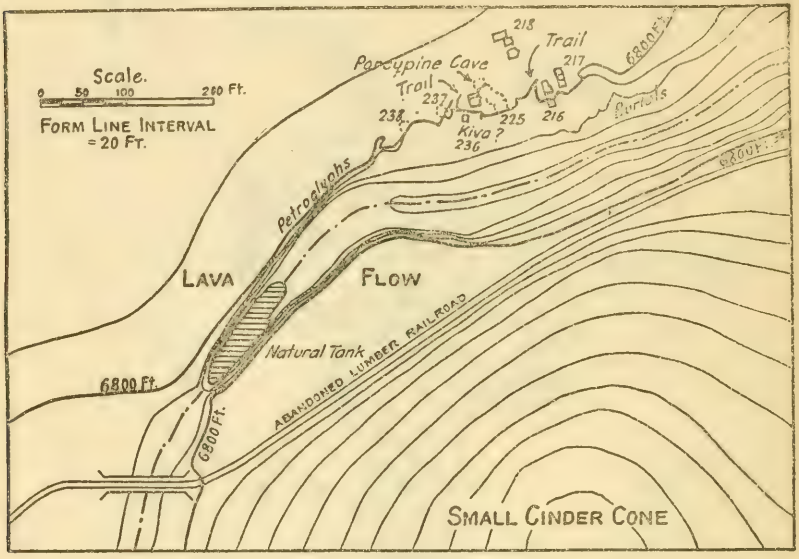


FIGURE 11.—Picture Canyon, showing the position of Porcupine Cave (225). Petroglyphs are abundant on rocks west of the cave

constructed. This wall, over 700 feet long, seems in places to have been breast-high, but is now in many stretches a mere retaining wall for a terrace. At the northeast end the wall merges into a series of dwellings which form a kind of bastion. From the middle of the long wall and perpendicular to it runs a second wall combined with a series of rooms. This wall forms the inner line of defense. A third wall into which was also combined a number of dwellings quite as in the pueblo architecture of the region.

Another unusual feature of the houses in and about this acropolis is the underground rooms which almost every house possesses—a type of cellar. This recalls the feature of Old Caves Pueblo 4 miles to the west as described by Fewkes (1904). There the rooms were hollowed out of the half-fused scoria; here at Red Peak the rooms are

excavated in the soft cinders, necessitating retaining walls. This feature is unique.

Although no kivas are recognized on Red Peak, yet a large building 24 by 36 feet may have played a part in the ceremonies of the inhabitants. This large single-roomed building recalls similar rooms at Zuñi, in Verde Valley (Mindeleff, 1896), and in the Tonto Basin (Fewkes, 1904), supposedly used for purposes of ceremony.

We can not leave Red Peak without some reference to its water supply. Lying as it does between two lava basins of Locketts Tank and Turkey Tanks, it is over 2 miles from the former and 3½ miles from the latter. It is possible that the curious inclosure in the center now filled with drifted sand is a reservoir or tank.

The extensive acropolis of Red Peak is useless for any economic purpose and with Old Caves it should be set apart as a National Monument.

Like other sites in this region, the pottery complex consists of Pueblo II and Pueblo III.

FORTRESS HILLS

On the east Gourd Flat is bounded by a row of four small volcanic hills, the origin of which is not very clear. The second hill from the south end is crowned by a well-built fort (Colton, 1918), while the slopes are dotted with depressions bearing potsherds of Rio de Flag brown ware. Since this region has already been fully described, nothing more need be added except that the earth lodge sites extend north onto the lava flow which issued from O'Neil Peak. All these sites belong to the culture horizon of Pueblo II.

TURKEY TANKS

Below the junction of the Rio de Flag, Walnut Creek enters a small lava canyon and like most of such canyons this contains pools of permanent water. Where water abounds ruins will be found.

Turkey Tank caves in section 26 were described by Fewkes (1900). The fort and ruins near the lower tank are figured and described by Colton (1918, *a* and *b*). These belong to the Pueblo III culture horizon. Earth lodge sites Pueblo II are scattered along the hilltops; on all of these Rio de Flag brown pottery is common. In the canyon east of Turkey Tanks lie a few cavate dwellings.

GRASS TANK AND PIPERS CRATER

East of Turkey Tanks, Walnut Creek enters a deep lava canyon, containing a few pools of water, and finally discharges on a wide lava, cinder, and cedar-covered plain. In a shallow canyon in the plain lies Grass Tank. Below Grass Tank the creek enters a limestone canyon in the plain. In the cedars about Grass Tank ruins are quite

numerous; Pueblo III masonry houses and Pueblo II pit-house sites are abundant.

The most notable Pueblo III ruins in this region are as follows:

(*a*) An eyrie little ruin of five rooms (No. 475) perched on a precipitous spatter cone in section 31.

(*b*) A 7-room house (No. 473) with kiva and small circular building 4 feet in diameter. The author excavated this latter to the depth of 4 feet and found the stones of the east side resting on a burial. This he left intact. Such small circular underground chambers are fairly common in connection with ruins in the cedars. The author makes no suggestion as to their function.

(*c*) The "Ridge Ruin" (No. 1785) in section 7 was discovered by Mr. J. C. Clarke. For this region with some 30 rooms on the first floor, it is one of the larger pueblos. Traces of two kivas are evident.

(*d*) A well-preserved ruin built of lava blocks covers the top of the western rim of the crater northeast of Pipers Ranch. It is a site comparable to the acropolis of Red Peak but much smaller. The walls, nothwithstanding their laval construction, are in a good state of preservation. Cavite dwellings and boulder sites scatter down the southeast end of the ridge.

(*e*) One-half mile east of No. 473 on the brink of the canyon of Walnut Creek lies an interesting ruin (No. 885) with 11 rooms on the ground floor.

(*f*) In a lava cave on the north side of the canyon below No. 885 lies a well-preserved kiva (No. 886) with the roof about one-fifth intact. As it shows the structure of the kiva roof it is worth mention. It is about 9 by 9 feet with 6 feet depth. A ventilator and shaft have been exposed by Mr. J. C. Clarke. A section of the kiva can be seen in Figure 21. Very few potsherds were found.

(*g*) East of the kiva, in another similar cave, is a small, well-preserved cliff dwelling (No. 887).

(*h*) One hundred feet east of ruin No. 885 lies a bowlder site with Deadmans Flat black-on-white, fugitive red, and walnut red. Pueblo II.

(*i*) Ruin No. 521 on the north side of Walnut Creek about a mile below Grass Tank has about seven rooms and in 1925 the author excavated the kiva, 15 feet 9 inches by 12 feet 6 inches, exposing a ventilator 8 inches by 9 inches and deflector 1 foot by 2 feet on the east side. In front of the deflector lies the fireplace, 10 by 12 and 10 inches deep.

(*j*) One mile north of the Ridge Ruins on the edge of the same lava flow lies a pueblo ruin which we have called Two Kivas (No. 700). It is a little smaller than the Ridge Ruin but similar to it in many ways.

Grass Tank and Youngs Canyon have evidently furnished water for the inhabitants of this region. Other tanks in Walnut Creek, now dry, seem to account for the concentration of sites in certain places.

Among the Big Cinder Cones

After alternately passing through limestone and lava canyons, Walnut Creek permanently enters the limestone. Where it passes its last lava flow pools of water remain. These pools constitute Walnut Tanks.

About Walnut Tanks and on the west flanks of Merriam Crater lie a few small pueblo ruins and earth lodge sites. They are notable because they were built in a treeless, waterless waste. Although but few have been recorded, sites have been found wherever looked for between the cinder cones and the Little Colorado, but they are few and far between.

Tolchaco

The region about Tolchaco, the old crossing or ford of the Little Colorado, much used before the bridge was built at Leupp, contains some interesting ruins. One only, the "Burned Ruin," was visited and measured.

On a red sandstone rock overhanging the river this little building with 19 first-floor rooms is interesting. Having been destroyed by fire when stored with corn, the intense heat fused the clay or abode floors, forming a kind of slag frequently called lava by the uninitiated. The ground all about is covered with carbonized ears of corn, slag, and much pottery scrap.

The pottery is distinctly that of the southern complex: Elden corrugated ware and Little Colorado black-on-white, and gray corrugated ware. It is interesting because it lies on the edge of a culture area. Although other ruins were not visited in the region, the author has been informed that they exist. Late Pueblo III.

Bonito Park

As the Rio de Flag and Walnut Creek carry us from the pine forests of the mountains to the deserts along the Little Colorado near Leupp, so another similar series of sites leads us from the pines on the northeast side of the San Francisco Peaks to the Little Colorado near Black Falls. While the first series of sites is over 40 miles long, the series from Bonito Park to the river is less than 30 miles. In the pines west of Bonito Park near Jack Smith's Tank lie scattered a large number of sites of earth lodges. Some are vestibule houses and others are pit houses. The associated pottery, Deadmans black-on-white, Deadmans gray, Deadmans black-on-red, Deadmans fugitive red.

One of the earth lodge sites (No. 409) the author excavated in 1928, locating the fireplace. (For details see fig. 12.) In the summer of 1930 the Museum Expedition under Lyndon L. Hargrave excavated a large number of sites in this region. This area will be treated in a separate paper.

Deadmans Flat

Deadmans Flat contains two large groups of ruins, one cut by the old Grand Canyon Road and the other just east of the Tuba Road and south of Dove Tank. Here masonry granaries are associated with earth lodge depressions (pit house). The pottery is of the character-

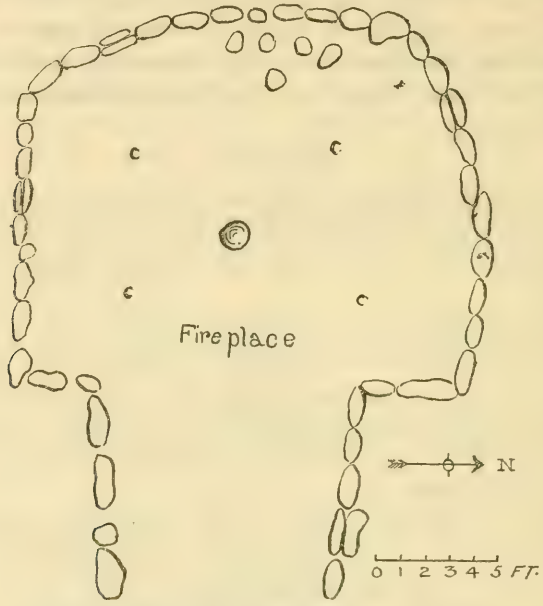


FIGURE 12.—Plan of earth lodge 409. The "vestibule," so called, seems not to have been an entrance but was used as a storage alcove

istic Deadmans Flat Pueblo II complex, in which plain gray wares predominate.

Although a large number of ruins have been measured and some are of fair size, no one is deemed worthy of special description.

Since all the ruins are located along the two washes that head north of Sugar Loaf Crater, it would seem to indicate that springs once existed which fed a stream running out from the mountain. An ancient dam was visible in 1923 across the wash near site No. 191.

Cedar Ridge and the Lava Terraces

After crossing Deadmans Flat the Tuba City Road climbs over Cedar Ridge. Off to the east lie a few scattered sites. None are

large and none are notable in any way. Continuing north, the Tuba Road drops off the Cedar Ridge lava flow on to a lower flow, the fourth terrace. Here ruins are very frequent and some are quite extensive. Nowhere else in the region can one better study the evolution of the

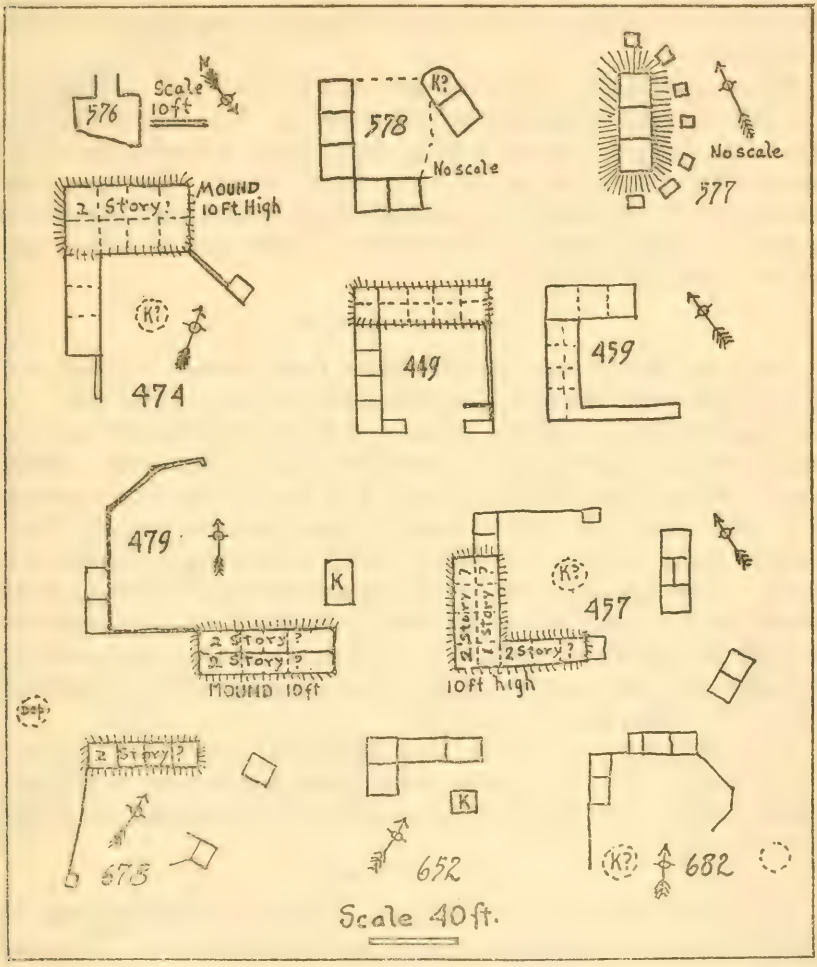


FIGURE 13.—Plans of a number of houses found on the lava terraces north of Deadmans Flat and east of the Tuba City road. 576 is an earth lodge of the "vestibule type." The others are Pueblo III masonry buildings. Most of the sites have associated with them a depression in the ground on the south or southeast side which is probably the kiva

2-roomed house into an L-shaped structure, and the L-shaped house into one surrounding three sides of a court. The most notable ruins are No. 438, two story with 14 to 16 rooms; No. 448, a two story, 10 to 12 rooms; No. 449, 10 rooms on the ground floor; No. 457, three story, 45 rooms on the ground floor; No. 459, two story, 22 rooms on the ground floor. (Fig. 13.) About half a mile northeast

of ruin No. 438 is an oval depression surrounded by a mound of excavated material. This depression has a north-south axis about 100 feet long and an east-west axis about 60 feet. This resembles the bowl at Casa Grande and at Wupatki.

Below the fourth terrace lies the third terrace. Although structures of two or three rooms are fairly abundant, none require a special description.

The second terrace lies north and east of the third. Three ruins are large enough to deserve special mention. No. 574, a mound 10 feet high, 18 to 20 rooms, 2 story, built about a court; No. 578, 7 rooms; No. 579, 8 rooms, all built about courts. The lower lava terrace lies to the east of the second, third, and fourth and extends nearly to Hulls Canyon. Although small ruins dot its surface none require particular mention.

Big Hawk Valley

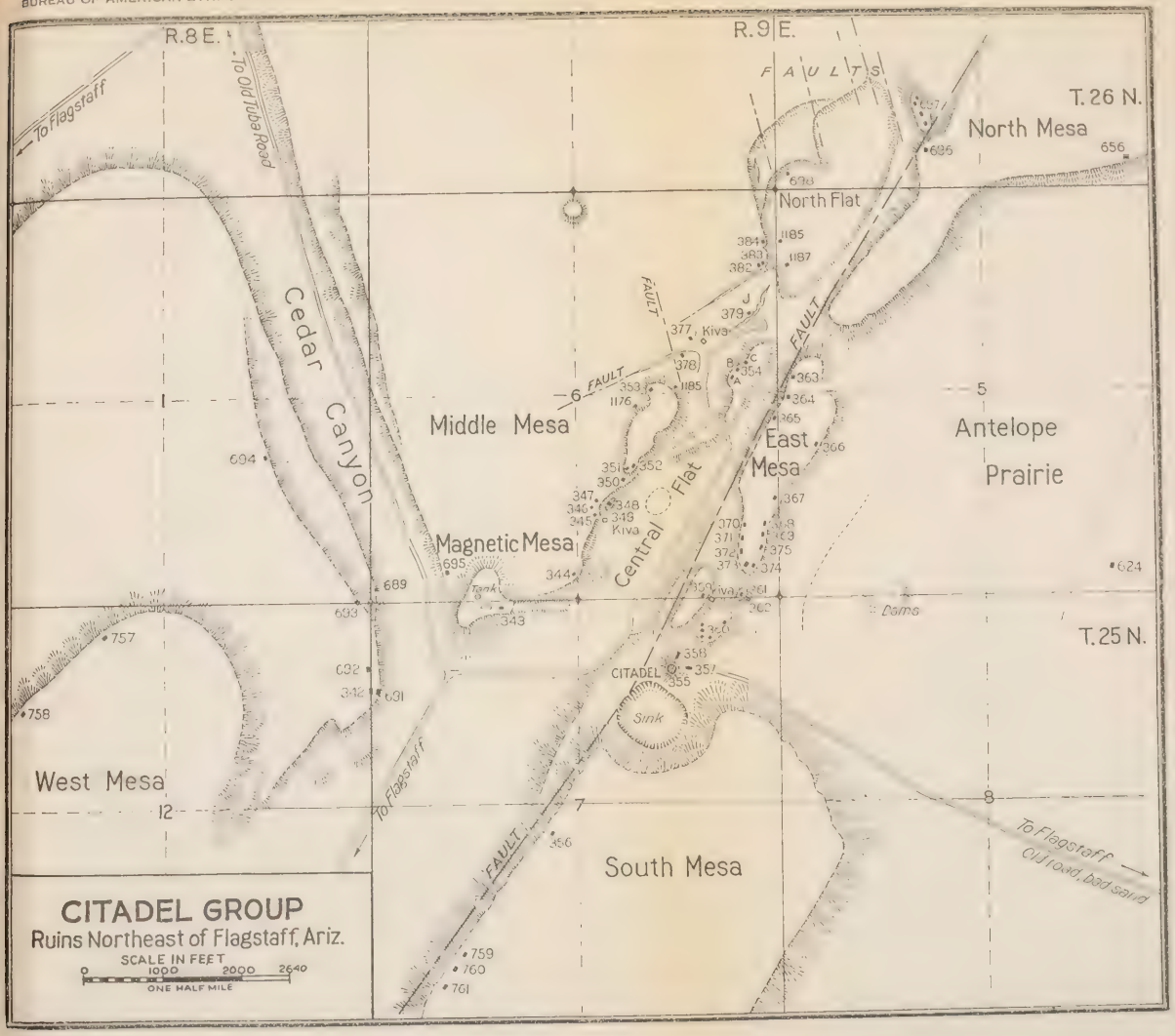
North of the terraces the old Tuba Road crosses a broad lava-filled valley while the new Tuba Road skirts it on the east side. We call this Big Hawk Valley. Crossing it on the old road one gains the impression that the valley is covered with ruins. However, a careful survey shows about 25, all located in a band about three-quarters of a mile wide and 2 miles long. These ruins are mostly 2 to 4 roomed stone houses with lateral walls embracing a southeastern court. A kiva could be inferred in some cases by a depression in the ground in the court, while northwest or northeast another depression seemed to represent a reservoir or tank or merely the excavation out of which the clay and stone were removed for building purposes. (Fig. 13.) Plans Nos. 678 and 682.

All of these sites are covered with Pueblo III potsherds except one, No. 618 (fig. 14), which is very much like a boulder site in the lower Tonto Basin. The pottery, however, is of the characteristic Pueblo II of the region.

Hulls Canyon

Big Hawk Valley has one branch extending northeast into the Citadel flat, but the drainage does not flow that way. The wash draining the terraces swings over the south mesa near the Citadel, then turns southeast into Hulls Canyon. Here are located 10 more sites. These ruins parallel the canyon, which is very shallow and filled with black volcanic sand. They rest on the limestone floor as the lava cap ends at the edge of the lower terrace a mile to the southwest. The ruins are built of limestone. A deep fissure in the limestone forms an interesting feature of this region. A mile southwest of the ruins in Hulls Canyon lies the Red House, No. 590, a 3-roomed, 2-story house, the central room of which has been restored by some sheepman and roofed. It lies on the Moencopi sandstone in the

To Flagstaff
758
West
CIT
Ruins No


R.8E.
R.9E.
FAULTS
T.26 N.
T.25 N.
To Flagstaff
To Old Tuba Road
Cedar Canyon
North Mesa
North Flat
Middle Mesa
East Mesa
Antelope Prairie
Magnetic Mesa
Central Flat
FAULT
Kiva
Tank
CITADEL
Sink
Dams
West Mesa
South Mesa
To Flagstaff
Old road, bad sand
CITADEL GROUP
Ruins Northeast of Flagstaff, Ariz.
SCALE IN FEET
0 1000 2000 2640
ONE HALF MILE

cedars, surrounded on three sides by lava cliffs of the lower terrace. The remains of a kiva (?) lie to the east of the house. The present walls of the central room are lower than the original 2-story house but higher than the original first floor, which must have had a very low headroom, judging by the sockets for the joists. The present doorway is new. It is interesting to note that the joists were made of cottonwood. No cottonwood is found at present nearer than the

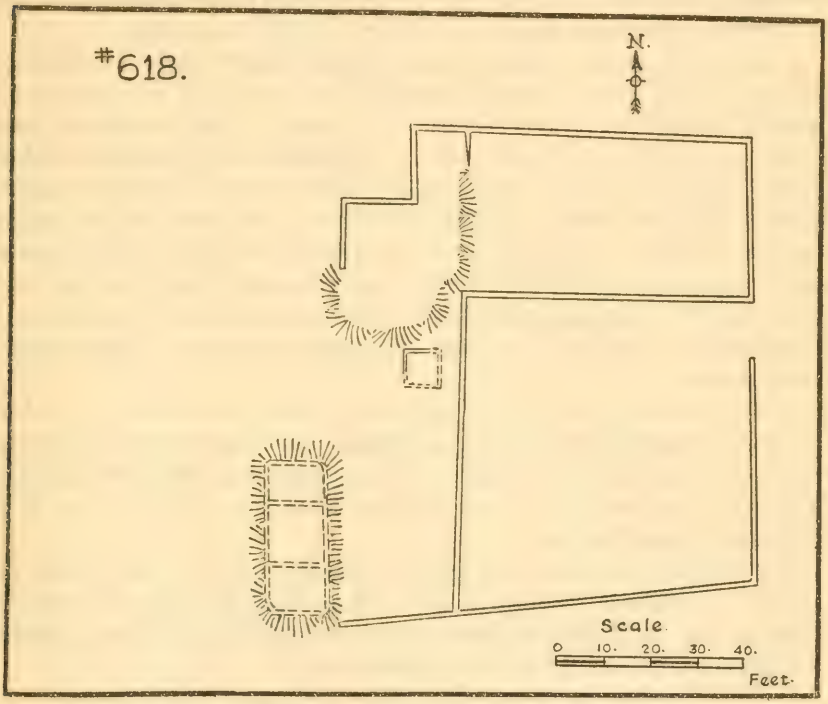


FIGURE 14.—House 618. A Pueblo II site in Black Hawk Valley

Little Colorado River, 15 miles away. A more careful exploration of the cedars in this region would no doubt reveal other sites.

CITADEL

Northeast of Flagstaff, on the steppes forming the western portion of the Painted Desert, are two curious sinks about 100 yards across, the geologic origin of which is not clear. Both sinks seem to be on fault lines. They are on the eroded edge of a basaltic lava flow, probably of the first period of eruption of the San Francisco volcanic field (Robinson, 1912). In each sink the lava lies on a thin bed of Moencopi red sandstone underneath which the Kaibab limestone is exposed for 50 feet or more. About both of these sinks the early inhabitants of the region built dwellings. The first, Citadel sink, located in township 25 North, range 9 East, section 7, lies on the south-

ern edge of a large group of ruins described in part by Fewkes (1897 and 1904) and Barrett (1926). The second sink (township 25 North, range 9 East, section 19) has about it fewer ruins; some cliff dwellings inside (about six rooms) and some small houses on the rim.

Neither within nor without the sinks is water at present found. Indeed, the whole region is so waterless that the cattle and sheep can not use the range, although it produces excellent grass. Cattlemen and sheepmen, attracted by the ruins, have made serious attempts to develop water, but the ancient source is still a mystery.

A drainage system, taking origin in the cinder cones 10 miles to the west of the sinks, flows in shallow canyons in the lava eastward, passing through Big Hawk Valley to the north of the second sink and to the south of the Citadel sink. Turning south, the wash enters Hulls Canyon, a cinder-filled valley, and diverges into Deadmans Wash. From the Tuba City Road to Deadmans Wash its dry sandy bed is bordered by ruins on either side and at one place near the crossing of the wash by the Old Tuba Road, Navaho teamsters are said to get water by digging in the sand. This spot is called "Aztec Seep." It is possible, therefore, that this wash once contained a large underflow of water.

Again, although not visible in many places because of the talus, the water-bearing Moencopi sandstones and shales outcrop on the edge of almost all the lava caps. Here springs may have once existed as they do now under similar conditions farther southeast in the Wupatki and Rodin Basins.

Be that as it may, the only positive sources of water are a tank on the top of Magnetic Mesa, a tank south of Ruin No. 360, and two or three dams in the broad depression in Antelope Prairie, three-quarters of a mile east-southeast of the Citadel ruin.

Rising above the northeast rim of the first sink, a little mesa of red sandstone, capped with basalt, supports an impressive ruin having 30 rooms on its ground floor, called by Fewkes the Citadel. (Fig. 15.) In the center of the patio is a depression which may represent a kiva. The hillside to the east is terraced and two other sites, 357 and 358, lie at the base. The culture horizon of the Citadel, as well as all the other standing ruins in this part of the Wupatki National Monument, is that called Pueblo III. However, Pueblo II sites are common, but in most cases have been reoccupied in Pueblo III times.

North and west of the Citadel (map, pl. 5) are two shallow canyons intersecting and forming a letter T. The southwest arm received the drainage from a limited area to the southwest but may have once received the drainage from Aztec Seep, as the dividing line between the two systems is very low. The arm called Cedar Canyon drains to the northwest, while the northeast arm drains into a blind basin without any outlet. The drainage, therefore, is peculiar.

Coupled with this peculiar lay of the land, mention must be made of a number of fault lines; a system running north-northwest and south-southeast is crossed by a system running at right angles to it.

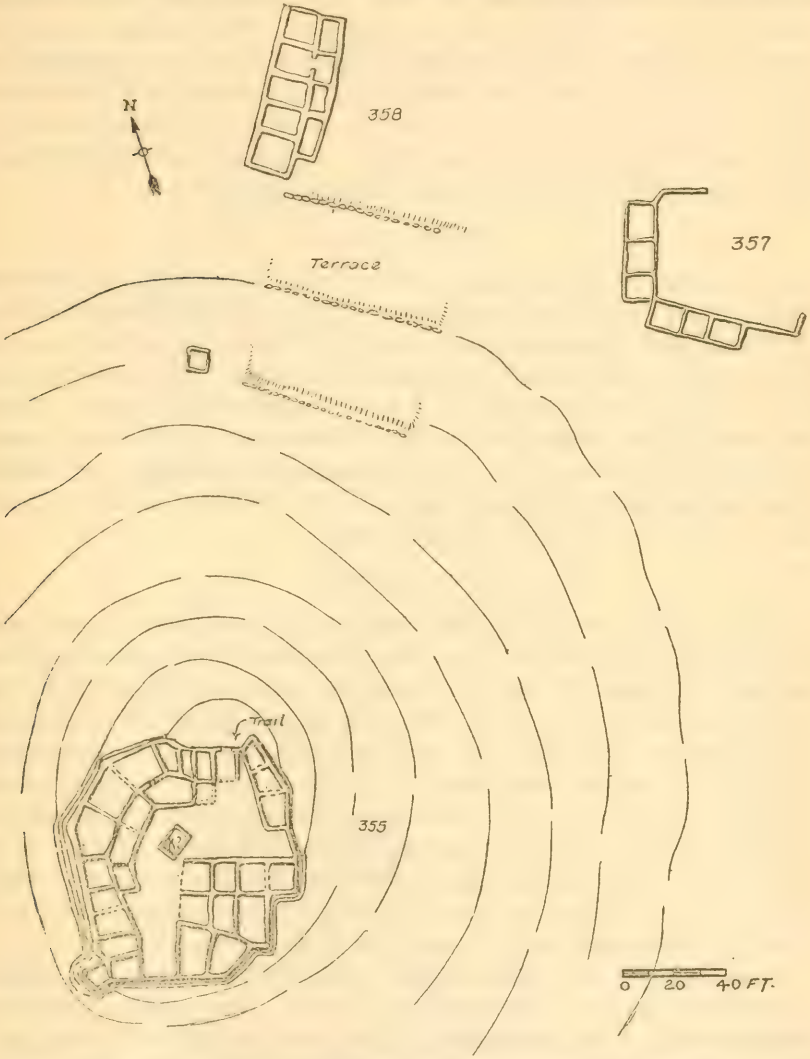


FIGURE 15.—The Citadel, 355, occupying the top of a butte, the eroded remnant of an ancient lava flow. The Citadel is a landmark on the western edge of the Painted Desert and is the center around which are grouped large numbers of other sites. It lies in the Wupatki National Monument

At these faults the Kaibab limestone has weathered into deep fissures and in places into little meaningless canyons.

Scattered along the canyon rims and mesa tops are a large number of ruins. Where the building material has been good, such as limestone or sandstone, the walls stand well. On the other hand, when lava has furnished the material, little shows but a pile of stones.

Since Fewkes (1904) and Barrett (1926) described the major ruins, space forbids a repetition. However, mention must be made of the rectangular kivas which show particularly well at certain places, viz, Ruin No. 373 and Ruin No. 379. At Ruin No. 377 a cattleman, mistaking the kiva for a well, excavated it. Not finding water, he continued digging. Now a shaft 60 feet or more deep reaches the talus of the valley floor, and represents a futile attempt to get water.

The major ruins of the Citadel group with their well-preserved walls should be protected from further inroads of wind and water. They are included in the Wupatki National Monument.

Antelope Prairie

East of the Citadel, a broad grass-covered limestone plain extends to the Doney Mountain escarpment. This plain is bounded on the north by North Mesa and on the south by the dense cedars between Hulls Canyon and Doney Mountain. Fourteen ruins were located here, all of the familiar type of 2 to 8 roomed stone houses. Dams were found in the shallow wash that follows the foot of North Mesa. This part of the present dry range is grazed by antelope only; water being too far away for stock and rainfall too light to fill artificial tanks. (Fig. 13, sites 652, 678, and 682.)

Wupatki Basin

A geographical region of considerable unity comprises the red rock country on the west side of the Little Colorado River extending from Rodins Spring and the near-by crater on the south to Black Point on the north (map No. 2, pl. 5). We call this region the Wupatki and Rodin Basins. Although the red Moencopi sandstones and shales outcrop in a narrow band along the Little Colorado for many miles, here they widen out. The country is wild and desolate; mesas red and bare rise above shallow canyons floored with black volcanic sand. To the east, cliffs appear above the cottonwoods along the river. The Doney Mountain escarpment and great lava-capped cliffs, half buried in black sand dunes, bound the basin on the west.

On account of the water-holding quality of the Moencopi rocks, the ancient people built numerous houses. Because the building material was good and the rainfall light, these houses have stood well. Here are found the best-preserved ruins in the whole Flagstaff region.

The basin is hard to get at. Although the northern portion at Crack-in-the-Rock can be easily reached by automobile, and the southern portion approached on foot from Grand Falls or Rodins Spring, yet long stretches of black sand or precipitous lava cliffs block every approach to the central and most interesting region. The horse, therefore, is still the preferred mode of transportation to the ruins of the Wupatki Basin.

The Wupatki Basin takes its name from the principal ruin (fig. 16), called by J. C. Clarke, Wupatki (Hopi for long house). This double ruin, first pictured by Sitgreaves in 1853 and later described and figured by Fewkes (1904) and called by him Ruin A, Group B, is the

FIGURE 16.—Wupatki (405). A conspicuous and important site 7 miles west of the Little Colorado at Black Falls

best preserved, was the longest inhabited, and was the last to be abandoned of any ruins in the basin, and perhaps in the entire San Francisco Mountain area.

Space forbids a description of the ruin, yet its importance deserves a few words. It is notable first for the amount of wood and reeds

scattered about the ruin. Its size should be mentioned. Fewkes estimates 60 rooms, but this may be high, and from this number of rooms deduces a population of from 150 to 200 souls. Be this as it may, the ruin is larger than any other in the region except perhaps the Citadel. (Fig. 15.) A walled-in spring (now dry) a few hundred yards west of the ruin seems to have furnished the source of water supply. A well-preserved and remarkable walled-in oval depression lies on the canyon floor a couple of hundred yards west of the ruin.

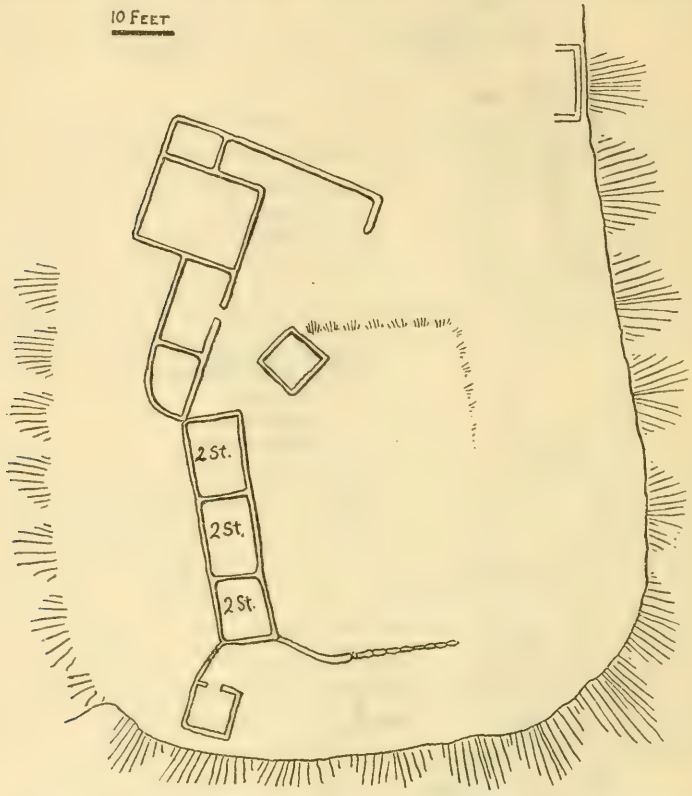


FIGURE 17.—Antelope House (625) at the mouth of Antelope Canyon between Wupatki and Crack-in-the-Rock. This site is one of many in the Wupatki Basin. Three rooms were two stories high, the rest one story

On the sandstone mesas about Wupatki are small house ruins of two to four rooms. North across the canyon stands No. 407, Ruin B of Fewkes, while a mile and a half farther north rises No. 640, Ruin C of Fewkes.

Ruin C of Fewkes proves to be the southernmost of some eighteen ruins clustering about the mouth of Antelope Canyon, which here bursts from the Doney Mountain escarpment. Although Fewkes visited and described but one ruin, several others are notable enough to deserve a word.

On a little bluff overlooking the Antelope Wash stands Ruin No. 625. Its shape and relation to the canyon rim on which it stands are shown in Figure 17. Although six rooms show but one story, two of them had at least two stories. The walls now stand 8 feet high. No doors show in the first floor.

Three miles east of Wupatki, across a sandstone plain, can be seen the tower of Wukoki, a prominent landmark.

Wukoki, the Tower House, No. 203, called by Fewkes (1904) Group C, Ruin A, is the most picturesque ruin in the Flagstaff area. Standing three stories high, it dominates the red canyon cut plain. It is not large, having but seven or eight rooms on the ground floor. Since Fewkes has described it and figured it, little more can be added except to plead for its conservation.

South of Wukoki on an island in a canyon lies Fewkes's Group C, Ruin B, No. 202, six rooms. The ruin is visible from Heisers

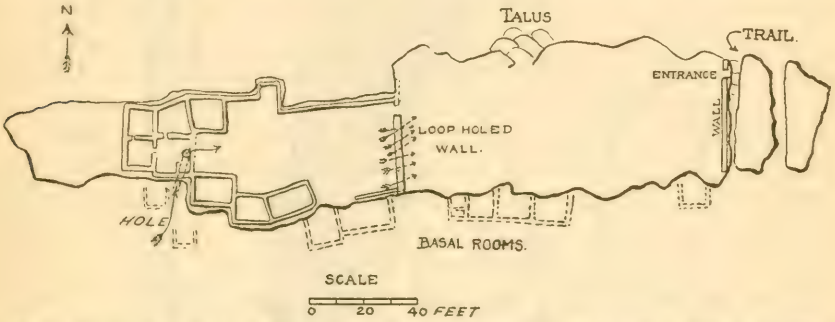


FIGURE 18.—Crack-in-the-Rock (537), a fort house or small "castle" built on a small mesa on the north end of the Wupatki Basin. The wall with its two series of loopholes, one aiming at the talus slope and the other series aiming at the door in the wall at the east end, is quite unusual in this region

Spring, being but a mile down the canyon. Since Fewkes has figured and described it nothing more need be added.

The other ruins in the basin are interesting because their walls are standing, but with the exception of doors (Ruin 636) and the water holes west of No. 632, no outstanding characteristic can be mentioned.

Crack-in-the-Rock (fig. 18) is the most northern of the ruins that can be included in the Flagstaff region. The great fault which runs north from Doney Mountain, exhibiting itself in a steep escarpment here, melts into a monocline and the Kaibab limestone which underlies the prairies west of the Little Colorado steeply dips under the red Moencopi. As we proceed east down the limestone slope a row of little red cuestras or inclined mesas are found lying on the sloping limestone floor. Although the northern cuestra bears no sign of a residence of ancient man except his petroglyphs, the second one supports a well-planned fort. This is Crack-in-the-Rock. South of Crack-in-the-Rock are two or three other cuestras, each bearing ruins and covered

with petroglyphs. Indeed no better exhibition of primitive drawing can be found in the region.

Crack-in-the-Rock (fig. 18) is a notable ruin, because it preserves the means of defense planned by the builders. A well-preserved

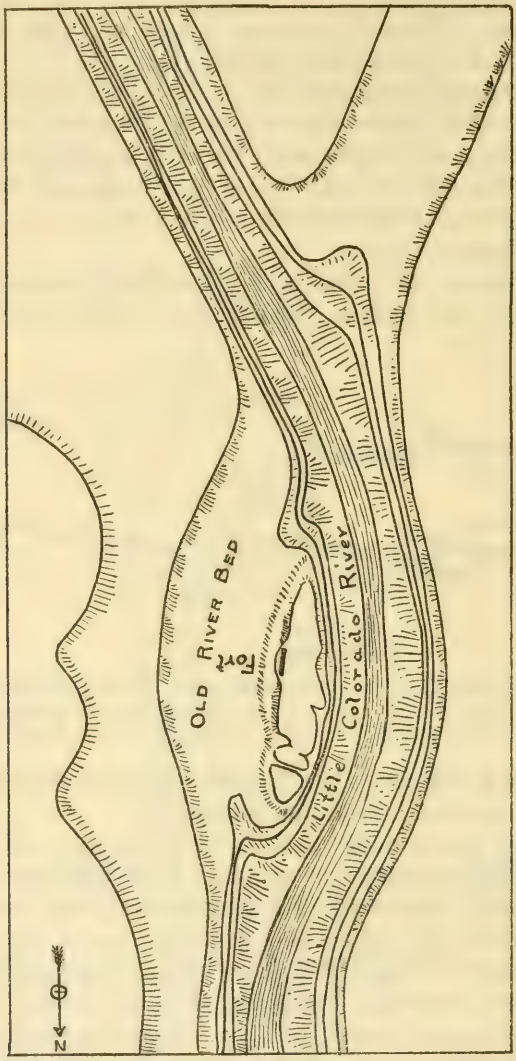


FIGURE 10.—Long Fort (580) lies on a little mesa overlooking the Little Colorado River, here in a deep canyon. This fort is of mysterious origin. It may or may not have been built by prehistoric people

building with eight first-floor rooms, which probably supported four second-story rooms, occupies the western end of the little, narrow, precipitous mesa. Across the eastern or low end of the mesa a north-south wall, pierced by a little door, divides the mesa into two halves. This middle wall of well-built masonry stands now over 8 feet high and is punctured by seven loopholes. Four of these loopholes aim

at the little door in the east wall and three at a place on the north side where the talus makes access to the mesa top easy.

Access to the top may be had in three places: Up a flight of steps in a crack in the rock and through the door at the east end; up the talus slope referred to above; and through a curious crack on the south side. This leads upward from one of the nine rooms at the base of the mesa, entering one of the rooms in the house on the mesa through a hole in the floor. Although the masonry on the mesa top has been well constructed, the small number of potsherds scattered about indicates that the mesa was occupied but a short time. The large number of stone chips on the site is most striking and indicates that the place was used in time of trouble.

Rodin Basin

Geographically part of the Wupatki Basin and separated from it by the remains of an old lava flow lies the Rodin Basin, watered by three existing springs. In this basin are ruins, of which the most notable is the fort 4 miles north of the Grand Falls, on the east rim of the deep box canyon of the Little Colorado River. (Fig. 19.)

There is no ruin like this one in the whole region. A rectangle, 80 feet long on its north and south axis and 12 feet wide, with two doorways on the west side, has walls 3 to 4 feet thick and 4 feet 6 inches high. (Fig. 20.) The walls were never higher and stand now much as built. The most conspicuous character of the ruin is the loopholes in the walls; on the north end two loopholes, on the east side 19 loopholes, on the south end 2, and on the west side 14, as well as one in each corner. The loopholes are in two tiers and so arranged that 60 men could defend it against an enemy.

Mr. J. C. Clarke picked up two potsherds, but otherwise no trace of the makers exists. The loopholes are larger than usual in the neighboring Indian houses, being 8 by 12 inches. The masonry walls are built without adobe mortar and consist of two, an outer and an inner dry wall, the space between filled with fragments of limestone. Except for the lack of mortar, the construction is much like other work in the neighborhood. It is impossible to state at the present time who the builders were. It might have been built by a company of Spaniards for all we know, or may be the remains of an incident in the Mormon migration of the seventies. Be that as it may, the place was never a habitation. On the south end of the mesa a Pueblo II cliff shelter has been recently found. This may be a clue to the builders of the fort.

Across the river the red mesas bear a number of loopholed houses. They are small, with one to two rooms, but on account of the low

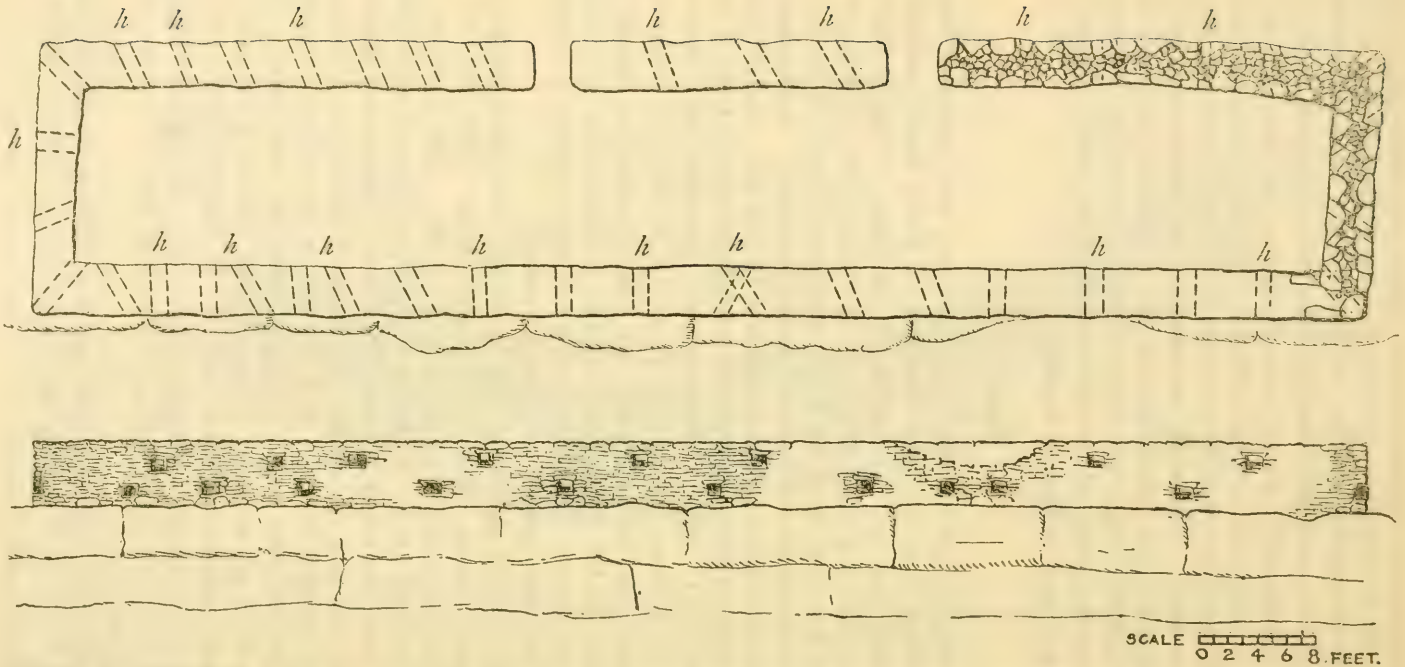


FIGURE 20.—Long Fort 580 plan and eastern elevation. The 37 loopholes in the walls are larger than usual in this region (*h*, the upper tier of loopholes). In the broken place in the eastern wall two more loopholes probably existed

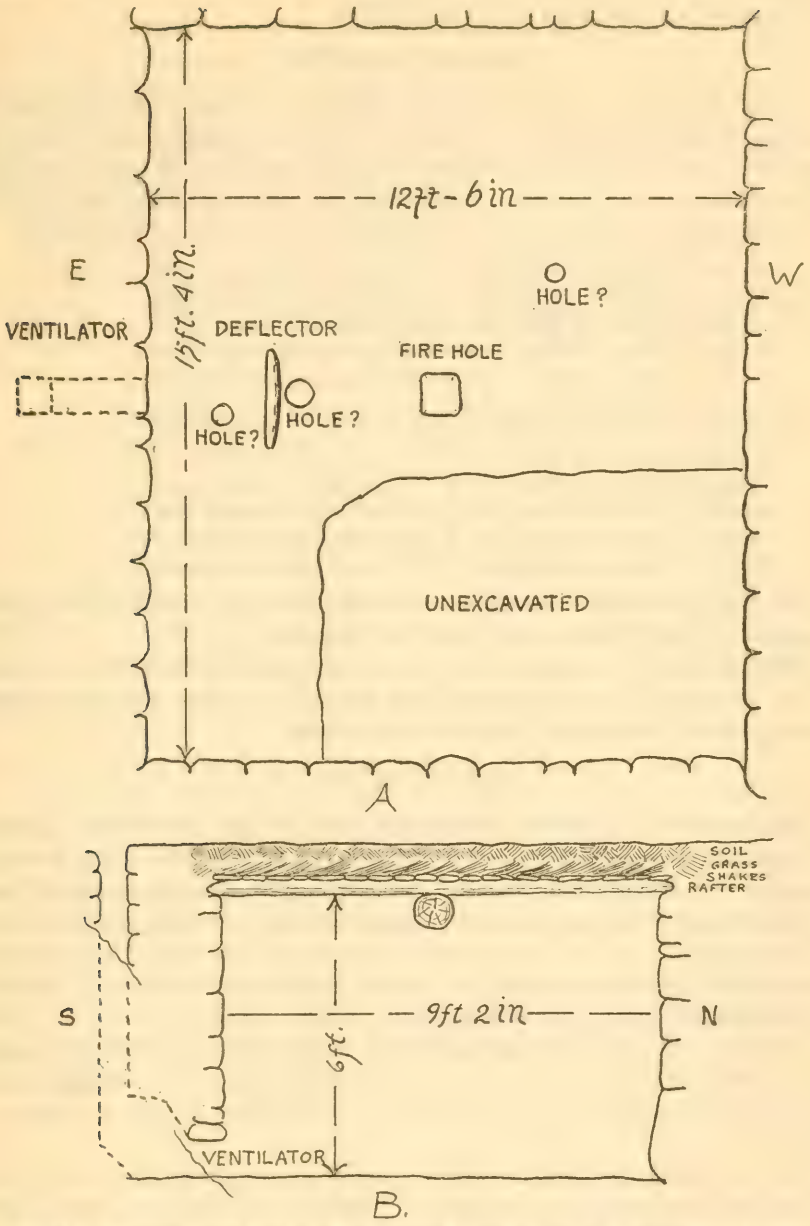


FIGURE 21.—The small house kiva in the San Francisco Mountain region is rectangular. *A*, Plan of kiva (521) showing ventilator, deflector (a sandstone slab), and fireplace. Between the fireplace and the deflector is the posthole for the ladder. *B*, Section of kiva (886) which was built in a cave. Here was preserved the roof construction, a large center beam supporting the rafters which in turn support shakes on top of which lie grass and soil

rainfall and good building material are well preserved. Three other ruins given on the map were not visited.

NUMBER OF SITES

Over the entire area included in the survey, ruins were not found. In most cases they are grouped about some present water supply and in others about some water supply now lost or undeveloped. If we study the 112 sections (square miles) which contain 610 Pueblo III and late Pueblo II sites, we find that the density is as follows:

Occupied portion of Map No. 1—4.8 houses per square mile.
Occupied portion of Map No. 2—4.0 houses per square mile.
Occupied portion of Map No. 3—3.0 houses per square mile.
Occupied portion of Map No. 4—8.3 houses per square mile.
For the whole occupied region—5.7 houses per square mile.

In terms of the 2,107 rooms the density was as follows:

Occupied portion of Map No. 1—19.1 rooms per square mile.
Occupied portion of Map No. 2—12.3 rooms per square mile.
Occupied portion of Map No. 3—8.5 rooms per square mile.
Occupied portion of Map No. 4—24.3 rooms per square mile.
For the whole occupied region—18.8 rooms per square mile.

If only one-tenth of the rooms were occupied at one time this would represent a population of at least 210 families.

This is true of a region now largely uninhabited but which in the most favorable places supports less than 25 families who gain their living, or at least part of it, from agriculture.

AGE OF RUINS

Since every one wishes to know the age of ruins, in 1918 the author attempted to date the sites in the Flagstaff area following the sequence of dry and wet periods as determined by Douglass in the Flagstaff area and Huntington and Douglass in the big trees in California. (Huntington, 1914.) Since then Douglass has developed his method of tree-ring chronology and has actually dated the following sites in the Flagstaff area (Nat. Geog. Mag., Dec., 1928).

Pueblo III sites: Wupatki, 1087–1197; Citadel, 1192; Turkey Hill, 1203–1278; Ruin J, 1192. In general Pueblo III extended from about 1050 to 1300 A. D.; Pueblo IV, 1300–1600; Pueblo V, 1600 to date.

A few Pueblo II sites have been dated about 900 A. D. So far no dates are available for Pueblo I or earlier. We can but hope that Doctor Douglass will find time to study the vast amount of good pine charcoal that is now available, catalogued and stored in the Museum of Northern Arizona.

SUMMARY

(1) This paper records 728 sites in the drainage areas of Walnut Creek and Deadmans Wash; two tributaries of the Little Colorado River draining the San Francisco Peaks.

(2) Eight types of houses have been recorded: Masonry pueblos, forts, cavate dwellings, cliff shelters, masonry granaries, cave granaries, pit houses, and vestibule houses.

(3) The common kiva is rectangular.

(4) Two large oval depressions called bowls are recorded.

(5) Twenty-two common pottery types are described.

(6) Four culture horizons have been recognized in the area covered by this survey: Basket Maker III, Pueblo I, Pueblo II, and Pueblo III. Pueblo IV is not represented.

(7) In the culture horizons Pueblo II and Pueblo III the pottery complexes in the Walnut Creek drainage differ from those in Deadmans Wash.

(8) In general Basket Maker III, Pueblo I, and Early Pueblo II are found close to the Peaks or close to the river.

(9) In late Pueblo II and Pueblo III, sites are found thickly distributed from the Peaks to the river. This seems to be associated with a fall of volcanic ash which occurred in middle Pueblo II times. After the fall basaltic sand was used as tempering material in certain wares.

(10) From this it is inferred that the sand made a mulch conserving moisture and making agriculture possible over a wider area.

(11) By late Pueblo III times (1200) the ash had accumulated into dunes or had been blown into the canyons, so that the surface of the ground was bare once more; at this time again the sites are close to the peaks or near the river.

(12) Agriculture by Hopi methods would be possible were the soil mulched by a layer of sand.

(13) The numerous problems which have presented themselves can only be solved by excavation. A beginning has been made and a paper on Pueblo II pit houses is in preparation.

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APPENDIX

This part of the report is an annotated list of all the sites visited. This list is organized by geographic regions which correspond to the text and the maps.

In tabular form the following information is concentrated:

(*a*) Serial number of site.

(*b*) Township north of Arizona base line.

(*c*) Range east of Gila and Salt River meridian.

(*d*) Number of section within the township.

(*e*) Kind of house: E. L., earth lodge; B. S., a boulder site which may represent an earth lodge or pit house; Dep., a depression in the ground, perhaps the site of a pit house or a kiva (?); Sh. A., area covered by sherds with no house remains visible, which may be the site of an earth lodge or pit house; St. H., stone house; Cav., a cave hollowed out of brecchia under a lava flow; C. H., cliff shelter or cliff house.

(*f*) Material: Lava; L. S., Kaibab limestone; SS., Moencopi red sandstone.

(*g*) Estimates of number of rooms.

(*h*) Period: Pueblo I, II, or III.

(*i*) Remarks: Place where plans or illustrations may be found; miscellaneous notes.

In 1923 when a large number of sites were recorded, culture strata were not recognized and few sherds were collected. It can be assumed with little chance of error that all stone houses with two or more rooms belong to Pueblo III, and all sites with the symbols E. L., B. S., and Sh. A. were Pueblo II or earlier.

Only four sites have been identified with late Pueblo III: Nos. 72, 142, 405, and 660.

Rio de Flag—Region North of Flagstaff

37 sites. Map 4

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
21	22	7	34	E. L.	Lava	3	P. II	Colton, 1918, b. plan.
22	22	7	34	E. L.	Lava	1	P. II	Do.
23	22	7	34	E. L.	Lava	1	P. II	Do.
24	22	7	34	E. L.	Lava	2	P. II	Do.
25	22	7	33	E. L.	Lava	1	P. II	Do.
26	22	7	33	E. L.	Lava	2	P. II	Do.
27	21	7	3	E. L.	Lava	1	P. II	Do.
28	21	7	3	E. L.	Lava	1	P. II	Do.
152	21	7	4	E. L.	Lava	1–2	P. II	
153	21	7	4	E. L.	Lava	1	P. II	
154	21	7	4	E. L.	Lava	1	P. II	
155	21	7	4	E. L.	Lava	1	P. II	
156	22	7	33	E. L.	Lava	1	P. II	
158	21	7	4	E. L.	Lava	1	P. II	
168	22	7	33	E. L.	Lava	2	P. II	Colton, 1920, plan.
169	22	7	33	E. L.	Lava	2	P. II	
170	22	7	33	E. L.	Lava	1	P. II	
171	22	7	33	E. L.	Lava	1	P. II	
172	22	7	33	E. L.	Lava	1	P. II	
173	22	7	33	E. L.	Lava	1	P. II	
174	22	7	33	E. L.	Lava	1	P. II	
175	22	7	33	E. L.	Lava	1–2	P. II	
176	22	7	33	E. L.	Lava	1	P. II	Do.
177	22	7	33	E. L.	Lava	1	P. II	
178	22	7	33	E. L.	Lava	1	P. II	
179	22	7	33	E. L.	Lava	1	P. II	
180	22	7	33	E. L.	Lava	1	P. II	
231	22	7	33	St. H.	Lava	1	P. II	
232	22	7	33	St. H.	Lava	5–6	P. II	
273	21	7	9	E. L.	Lava	2	P. II	
274	21	7	9	E. L.	Lava	1	P. II	
281	22	6	13	Cave	Lava	9	P. II	Little Le Roux Spring.
282	22	6	13	Sh.			P. II	Do.
283	21	7	9	Sh.			P. II	Shards buried in Rio de Flag Arroyo.
776	22	6	14	Sh.			P. II	Big Le Roux Spring.
914	21	8	6	Sh.			P. II	
1290	22	7	34	E. L.			P. II	

Rio de Flag—Region of Elden Spring

58 sites. Map 4

29	21	7	12	Sh.		1 ?	P. II	
30	21	7	12	Sh.		1 ?	P. II	
32	21	7	12	E. L.		2	P. II	Colton, 18, *b*, Fig. 30, plan.
33	21	7	12	Sh.			P. II	
34	21	7	12	E. L.	Lava	1	P. II	Do.
35	21	7	12	B. S.	Lava	1	P. II	Do.
36	21	7	12	B. S.	Lava	2	P. II	Do.
37	21	7	12	B. S.	Lava	1	P. II	At spring.
38	21	7	12	B. S.	Lava	1	P. II	
39	21	7	12	Sh.			P. II	
55	21	7	12	B. S.	Lava	2	P. II	

Rio de Flag—Region of Elden Spring—Continued

58 sites. Map 4—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
56	21	7	12	B. S.	Lava	1	P. II	
57	21	7	12	Dep.	Lava	1	P. II	Colton, 18, *b*, Fig. 33, plan.
58	21	7	12	E. L.	Lava	1	P. II	Do.
59	21	7	12	E. L.	Lava	2–4	P. II	Do.
60	21	7	12	B. S.	Lava	2–3	P. II	Do.
61	21	7	12	B. S.	Lava	1	P. II	Do.
62	21	7	12	B. S.	Lava	2	P. II	Do.
63	21	7	12	B. S.	Lava	1	P. II	Do.
64	21	7	12	E. L.	Lava		P. II	Do.
65	21	7	12	Mound	Lava	1	P. II	Do.
66	21	7	12	Wall	Lava		P. II	
67	21	7	12	B. S.	Lava	2	P. II	Do.
68	21	7	12	B. S.	Lava		P. II	Do.
74	21	7	12	B. S.	Lava	1	P. II	Colton, 18, *b*, Fig. 32, plan.
77	21	7	11	Mound			P. II	Colton, 18, *b*, Fig. 31, photo.
78	21	7	11	Mound		3	P. II	
79	21	7	11	Sh.			P. II	
90	21	7	11	Cave			P. II	
91	21	7	11	Sh.			P. II	
92	21	7	11	B. S.	Lava	1	P. II	Colton, 18, *b*, Fig. 33, plan.
94	21	8	2	Cave	Lava	1	P. II	Colton, 18, *b*
98	21	7	11	B. S.	Lava	4	P. II	Colton, 18, *b*, Fig. 33, plan.
100	21	7	11	Mound	Lava	3	P. II	Do.
102	21	8	7	Mound	L. S.	4	P. II	Colton, 18, *b*.
107	21	7	11	Mound	Lava	1	P. II	Colton, 18, *b*, Fig. 33, plan.
120	21	7	11	Mound	Lava	3	P. II	Do.
121	21	7	11	Mound	Lava	5	P. II	Do.
122	21	7	11	Mound	Lava	10	P. II	Do.
123	21	7	11	Mound	Lava	1	P. II	Do.
124	21	7	11	Mound	Lava	4	P. II	Colton, 18, *a*; Colton, 18, *b*, illus.
125	21	7	11	Mound	Lava	1	P. II	Colton, 18, *b*, Fig. 33, plan.
126	21	7	11	Mound	Lava	1	P. II	Do.
127	21	7	11	Mound	Lava	1	P. II	Do.
128	21	7	12	Mound	Lava	10–4	P. II	Group of earth lodges; Colton 18, *b*, Fig. 30, plan, incorrect.
129	21	7	12	B. S.	Lava	1	P. II	Do.
130	21	7	12	B. S.	Lava	1	P. II	Do.
131	21	7	12	B. S.	Lava	1	P. II	Do.
132	21	7	12	Dep.	Lava	1	P. II	Group of earth lodges; Colton, 18, *b*, Fig. 33, plan, incorrect.
133	21	7	12	Dep.	Lava	2	P. II	Do.
134	21	7	12	B. S.	Lava	1	P. II	Do.
135	21	7	12	Dep.	Lava	1	P. II	Do.
136	21	7	12	B. S.	Lava	1	P. II	Do.
137	21	7	12	B. S.	Lava	1	P. II	Do.
138	21	7	12	B. S.	Lava	1	P. II	Do.
139	21	8	6	B. S.	Lava	1	P. II	
140	21	8	7	Sh.			P. II	

Walnut Creek—Region of Walnut Canyon Cliff Dwellings

120 sites. Maps 4 and 6

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
103	21	8	25	St. H	L. S	8	P. III	Loc. cit., Fig. 4, plan.
104	21	9	17	St. H	L. S	1	?	Colton, 18, *b*, Fig. 35, plan.
105	21	9	16	St. H	L. S	4-6	P. III	Do.
106	21	9	15	St. H	L. S	3	P. III	Do.
107	21	9	15	St. H	L. S	2	P. III	Do.
108	21	9	15	B. S	?	1	P. II	Do.
244	21	9	15	St. H	L. S	3		Loc. cit., Fig. 9, plan.
245	21	9	23	Enclosure	L. S	1		Do.
246	21	9	28	St. H	L. S	1		Do.
247	21	9	28	St. H	L. S	2	P. II	Do.
248	21	9	28	St. H	L. S	2		Do.
249	21	9	28	St. H	L. S	1		Do.
250	21	9	28	St. H	L S	1		Do.
251	21	9	28	St. H	L. S	1		Do.
252	21	9	28	St. H	L. S	3		Do.
253	21	9	28	St. H	L. S	1		Do.
254	21	9	28	St. H	L. S	2		Do.
255	21	9	28	St. H	L. S	1		Do.
256	21	9	28	St. H	L. S	1		Do.
257	21	9	28	St. H	L. S	3		Do.
258	21	9	28	St. H	L. S	1		Do.
259	21	9	28	St. H	L. S	2		Do.
260	21	9	28	St. H	L. S	1		Do.
261	21	9	28	St. H	L. S	1		Do.
262	21	9	28	St. H	L. S	7±2	P. III	Do.
263	21	9	28	Kiva?	L. S	1		Do.
264	21	9	28	St. H	L. S	12+6?	P. III	Do.
265	21	9	28	St. H	L. S	3	P. III	Do.
266	21	9	28	St. H	L. S	2	P. III	Do.
267	21	9	21	St. H	L. S	1		
268	21	9	21	E. L	L. S	1		
269	21	9	21	St. H	L. S	1		
289	21	8	33	C. H	L. S	1		
290	21	8	34	C. H	L. S	2		
291	21	8	34	C. H	L. S	4		
292	21	8	34	C. H	L. S	1		
293	21	8	34	C. H	L. S	2		
294	21	8	34	C. H	L. S	2		
295	21	8	34	Fort	L. S	4		
296	21	8	27	C. H	L. S	4		
297	21	8	26	C. H	L. S	?		
298	21	8	26	C. H	L. S	3		
299	21	8	26	C. H	L. S	2-4		
300	21	8	26	C. H	L. S	2		
301	21	8	26	C. H	L. S	1		
302	21	8	26	C. H	L. S	4		
303	21	8	26	C. H	L. S	2		
304	21	8	26	C. H	L. S	5		
305	21	8	26	C. H	L. S	1		
306	21	8	26	C. H	L. S	2		
307	21	8	26	C. H	L. S	7		
308	21	8	26	C. H	L. S	2		
309	21	8	26	C. H	L. S	3		
310	21	8	26	C. H	L. S	1		
311	21	8	26	C. H	L. S	5		
312	21	8	26	C. H	L. S	2		
313	21	8	26	C. H	L. S	2		

WALNUT CREEK—REGION OF WALNUT CANYON CLIFF DWELLINGS—Continued

120 sites. Maps 4 and 6—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
314?	21	8	35	C. H.	L. S.	1		
315?	21	8	35	B. S.	L. S.	1		
316	21	8	26	Fort	L. S.	7		
317	21	8	26	C. H.	L. S.	1		
318	21	8	26	C. H.	L. S.	1		
319	21	8	26	C. H.	L. S.	1		
320	21	8	26	C. H.	L. S.	6		
321	21	8	26	C. H.	L. S.	9		
322	21	8	26	C. H.	L. S.	24		Loc. cit., Fig. 7, plan.
323	21	8	26	C. H.	L. S.	16		
324	21	8	26	C. H.	L. S.	6		
325?	21	8	26	C. H.	L. S.	2		
326	21	8	26	C. H.	L. S.	?		
327	21	8	26	C. H.	L. S.	6		
328	21	8	26	C. H.	L. S.	10		
329	21	8	26	C. H.	L. S.	3		
330	21	8	26	C. H.	L. S.	1		
331	21	8	26	C. H.	L. S.	4		
332	21	8	26	C. H.	L. S.	4		
333	21	8	26	C. H.	L. S.	4		
334	21	8	26	C. H.	L. S.	3		
335	21	8	26	C. H.	L. S.	2		
336	21	8	26	C. H.	L. S.	2		
337	21	8	26	C. H.	L. S.	3		
338	21	8	26	C. H.	L. S.	6		
385	21	8	35	St. H.	L. S.	5	P. III.	Loc. cit., Fig. 5, plan.
386	21	8	25	St. H.	L. S.	5	P. III.	Do.
387	21	8	36	B. S.	L. S.	1		
388	21	8	36	C. H.	L. S.	10		
389	21	8	36	C. H.	L. S.	1		
390	21	8	36	C. H.	L. S.	3		
391	21	8	36	C. H.	L. S.	2		
392	21	8	36	B. S.	L. S.	5		
393	21	8	36	C. H.	L. S.	?		
394	21	8	36	C. H.	L. S.	2		
395	21	8	36	C. H.	L. S.	3		
396	21	8	25	C. H.	L. S.	2		
397	21	8	25	C. H.	L. S.	4		
398	21	8	25	C. H.	L. S.	2		
400	21	8	26	C. H.	L. S.	2		
401	21	8	26	C. H.	L. S.	4		
475	21	8	25	St. H.	L. S.	2		Loc. cit., Fig. 4, plan.
476	21	8	25	(K?)	L. S.	1		Do.
477	21	8	25	St. H.	L. S.	1		Do.
478	21	8	25	St. H.	L. S.	1		Do.
671	21	8	36	St. H.	L. S.	3		
672	21	8	36	St. H.	L. S.	1		
673	21	8	36	St. H.	L. S.	1		
735	21	8	26	Fort C. H.	L. S.	1		
736	21	8	26	C. H.	L. S.	5		
737	21	8	26	C. H.	L. S.	4		
738	21	8	26	C. H.	L. S.	3		
739	21	8	26	C. H.	L. S.	10		
740	21	8	26	C. H.	L. S.	4		
741	21	8	26	C. H.	L. S.	4		
742	21	8	26	C. H.	L. S.	5		

Walnut Creek—Region of Walnut Canyon Cliff Dwellings—Continued

120 sites. Maps 4 and 6—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
743	21	8	26	C. H.	L. S.	4		
744	21	8	26	C. H.	L. S.	3		
745	21	8	26	C. H.	L. S.	3±2		
746	21	8	26	C. H.	L. S.	5		Loc. cit., Fig. 4, plan.
747	21	8	25	C. H.	L. S.	1		Loc. cit., Fig. 4, illus.
748	21	8	26	C. H.	L. S.	1		
775	21	8	36	C. H.	L. S.	1		

Rio de Flag—Region of Doney Park

37 Sites. Map 4

72	22	8	22	St. H.	Lava	76+4	P. III	Loc. cit., Fig. 10, plan; Colton, 18, *a*, Fewkes, 04 (pl. 1) illus. Old caves.
75	22	8	36	St. H.	Lava	8		Winslow Road Pueblo, Colton, 18, *b*, plan.
80	22	8	36	St. H.	Lava	2		
81	22	8	36	St. H.	Lava	1		
82	22	8	36	St. H.	Lava	1		
83	22	8	36	St. H.	Lava	1		
142	22	8	32	St. H.	Lava	49+K	P. III	Elden Pueblo plan, Fewkes, 1927; Colton, 18, *b*, illus.
216	21	8	4	St. H.	Lava	2		
217	21	8	4	St. H.	Lava	2		
218	21	8	4	St. H.	Lava	3		
219	21	8	4	Cave	Lava	4		
220	21	8	4	Cave	Lava	1		
221	21	8	9	St. H.	Lava	1		
222	21	8	9	St. H.	Lava	2		
224	21	8	4	B. S.	Lava	1	P. II	
225	21	8	4	Cave	Lava	2		
226	21	8	4	Cave	Lava	2		
236	21	8	4	St. H.	Lava	3	P. III	
237	21	8	4	Cave	Lava	1		
238	21	8	4	Cave	Lava	1		
507	22	8	32	St. H.	L. S.	8±5	P. III	
508	22	8	32	St. H.	L. S.	4		
660	22	8	35	St. H.	Lava	38±2	P. III	
661	22	8	35	St. H.	Lava	2		
662	22	8	35	St. H.	Lava	4		
663	22	8	35	St. H.	Lava	2		
664	22	8	35	B. S.	Lava	1		
665	21	8	1	St. H.	Lava	2		
666	22	8	35	St. H.	Lava	1		
667	21	8	1	St. H.	Lava	2 ?		
772	22	8	32	St. H.	Lava	5		
773	22	8	32	St. H.	Lava	2		
774	22	8	32	St. H.	Lava	3		
749r	22	8	29	St. H.	L. S ?			
917	22	9	14	Sh. A.		1	P. II	
918	22	8	15	E. L.		1	P. II	
919	22	8	15	Sh. A.		1	P. I	
920	22	8	15	E. L.		2	P. II	

Rio de Flag—Region of Doney Park—Continued

37 Sites. Map 4—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
921	22	8	15	E. L.		1	P. II	
922	22	8	15	E. L.		2	P. II	
923	22	8	15	E. L.		1	P. II	
2	22	9	32	St. H.	Lava	2	P. III	
10	22	9	29	Plaza			P. II	Loc. cit., pl. 10, plan.
12	22	9	29	Cavate	Lava	1		
13	22	9	32	St. H.	Lava	1		
14	22	9	32	St. H.	Lava	1		
15	22	9	32	St. H.	Lava	8		
16	22	9	32	St. H.	Lava	8		
18	22	9	32	St. H.	Lava	1		
19	22	9	32	St. H.	Lava	3		
51	21	9	4	B. S.	Lava	2	P. II	
52	21	9	4	Fort.	Lava	2	P. II	Colton, 18, *b*, plan.
53	21	9	9	Sh.			P. II	Colton, 18, *b*, illus.
54	21	9	9	Sh.			P. II	
84	22	9	32	St. H.	Lava	4	P. III	
85	22	9	32	St. H.	Lava	1		
86	22	9	32	St. H.	Lava	1		
87	22	9	32	Mound	Lava	?		
119	21	9	9	B. S.	Lava	1		
144	21	9	5	Cavate	Lava	1		Colton, 18, *b*, 35, plan.
145	21	9	5	St. H.	Lava	3		Do.
146	21	9	5	Cavate	Lava	1		Do.
148	22	9	34	St. H.	Lava	2±?		
270	22	9	33	E. L.	Lava	1	P. II	
271	22	9	33	St. H.	Lava	4		
272	22	9	33	St. H.	Lava	2		
481	22	9	29	St. H.	Lava	9–11		
482	22	9	29	St. H.	Lava	4		
483	22	9	29	St. H.	Lava	1		
484	22	9	29	St. H.	Lava	10		
485	22	9	29	St. H.	Lava	1		
486	22	9	29	St. H.	Lava	1		Loc. cit., pl. 4, plan; council chamber?
487	22	9	29	St. H.	Lava	1		Loc. cit., pl. 4, plan.
488	22	9	29	St. H.	Lava	10		Do.
489	22	9	29	St. H.	Lava	2		Do.
490	22	9	29	St. H.	Lava	1		Do.
491	22	9	29	St. H.	Lava	1		Do.
492	22	9	29	St. H.	Lava	6?		Do.
493	22	9	29	St. H.	Lava	3		Do.
494	22	9	29	St. H.	Lava	1		Do.
495	22	9	29	St. H.	Lava	13		Do.
496	22	9	29	St. H.	Lava	2		Do.
497	22	9	29	St. H.	Lava	2		Do.
498	22	9	29	St. H.	Lava	21		Do.
499	22	9	29	St. H.	Lava	1		Do.
500	22	9	29	St. H.	Lava	8		Do.
501	22	9	29	Terrace				Do.
502	22	9	29	St. H.	Lava	3		Do.
503	22	9	29	St. H.	Lava	7		Do.
509	22	9	29	St. H.	Lava	S+K		
510	22	9	29	E. L.	Lava	1		
511	22	9	29	St. H.	Lava	2		
512	22	9	28	St. H.	Lava	1		

Rio de Flag—Region of Doney Park—Continued

37 Sites. Map 4—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
513	22	9	28	St. H	Lava	1		
514	22	9	28	St. H	Lava	2+K ?		
515	22	9	28	St. H	Lava	5		
516	22	9	28	St. H	Lava	6		
517	22	9	28	St. H	Lava	5+K ?	P. III	
723	22	9	29	Cavate	Lava	1		Loc. cit., pl. 4, plan.
724	22	9	29	Cavate	Lava	1		Do.
725	22	9	29	Cavate	Lava	1		Do.
726	22	9	29	Cavate	Lava	1		Do.
727	22	9	29	Cavate	Lava	1		Do.
728	22	9	29	Cavate	Lava	1		Fewkes, 04, pl. 2, illus.; loc. cit., map 10, plan.
729	22	9	29	Cavate	Lava	1		Loc. cit., pl. 4, plan.
730	22	9	29	Cavate	Lava	1		Do.
731	22	9	29	Cavate	Lava	1		Do.
732	22	9	29	Cavate	Lava	1		Do.
733	22	9	29	Cavate	Lava	1		Do.
734	22	9	29	Cavate	Lava	1		Do.

Walnut Creek—Region of Turkey Tanks and Winona

28 sites. Maps 3 and 4

109	21	9	10	Sh				
110	21	9	21	Sh				
111	22	9	36	B. S	Lava	1		Colton, 18, *b*, 36, plan.
112	22	9	36	B. S	Lava	1		Do.
113	22	9	36	Fort	Lava	5	P. III	Do.
114	22	9	36	B. S	Lava	1		Do.
115	22	9	36	St. H	Lava	6+		Do.
117	22	9	26	Cavate	Lava	5 or 6	P. II+III	Fewkes, 04, pls. iii, iv, v, vi.
118	22	9	25	B. S	Lava	1		
159	21	9	12	E. L	Lava	2		
160	21	9	11	B. S	Lava	1		
161	21	9	11	B. S	Lava	1	P. II	
162	21	9	11	B. S	Lava	1		
163	21	9	11	B. S	Lava	1		
164	21	9	2	B. S	Lava	1		
165	21	9	2	B. S	Lava	1	P. II	
167	21	9	11	B. S	Lava	1		
239	21	9	36	Cave	Lava	1		Excavated cyst.
811	22	9	26	C. H			P. III	
1051	21	9	9	Sh. A			P. II	
1690	22	9	13	E. L			P. II	
1691	22	9	13	E. L			P. II	
1692	22	9	13	E. L			P. II	
1693	22	9	13	E. L			B. M. III	
1772	21	9	13	E. L			P. II	
1773	21	9	13	E. L			P. II	
1774	21	9	12	E. L			P. II	
1775	21	9	12	St. H. and E. L.	Lava	2	P. II; P. III.	

Walnut Creek—Region of Grass Tank

10 sites. Map 3

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
473	22	10	31	St. H	Lava	7	P. III	
474	22	10	31	St. H	Lava	5	P. III	Spatter cone ruin.
521	22	10	32	St. H	Lava	4+K?	P. III	
522	22	10	32	St. H	Lava	5+K?	P. III	
523	22	10	32	E. L	Lava	?	P. II	
524	21	10	6	St. H	Lava	2+K?	P. II; P. III	
699	22	10	32	St. H	Lava	1+		
700	21	10	6	St. H	Lava	15+2K	P. III	Two Kiva Pueblo.
718	22	10	28	B. S	Lava	2		
719	22	10	28	B. S	Lava	2		

Walnut Creek—Region of Pipers and Angell

26 sites. Map 3

525	21	10	20	St. H	L. S	5	P. III	
526	21	10	17	Cavate	L. S	1		
529	21	10	16	St. H	Lava	3+K?	P. III	
530	21	10	17	St. H	Lava	1		
531	21	10	17	St. H	Lava	1		
532	21	10	17	St. H	Lava	1		
533	21	10	17	St. H	Lava	1		
534	21	10	17	St. H	Lava	8	P. III	
709	22	10	36	St. H	Lava	1		
710	21	10	11	St. H	Lava	6		
711	21	10	11	St. H	Lava	6		
807	23	9	31	St. H	Lava	2	P. III	
808	23	9	31	St. H	Lava	2	P. III	
889	23	10	20	St. H	Lava	2	P. III	
1146	22	10	33	Sh. A		?	P. II or III	
1147	22	10	33	St. H	Lava	?	P. III	
1777	21	10	7	E. L			P. II	
1778	21	10	7	G			P. II	
1779	21	10	7	E. L			P. II	
1782	21	10	7	G			P. II	
1783	21	10	7	E. L			P. II	
1784	21	10	7	E. L			P. II	
1785	21	10	7	St. H	Lava	32 ?	P. III	Ridge ruin.
1786	21	10	7	E. L			P. II	
1788	21	10	7	E. L			P. II	
1789	21	10	7	E. L			P. II	

Walnut Creek—Region of Cinder Cones and Walnut Tank

22 sites. Map 3

195	22	10	19	B. S	Lava	1 ?		
196	22	10	19	K	Lava	1		
197	22	10	19	St. P	Lava	5		
198	22	10	19	B. S	Lava	1		
199	22	10	19	B. S	Lava	3		
341a	23	11	32	B. S	Lava	1		Buried in sand.
341b	23	11	32	B. S	Lava	1–3		Do.
341c	23	11	32	B. S	Lava	1		Do.

Walnut Creek—Region of Cinder Cones and Walnut Tank—Continued

22 sites. Map 3—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
341d	23	11	32	B. S.	Lava	1		Buried in sand.
704	22	11	28	St. H.	Lava	2		
705	22	11	29	St. H.	Lava	2		
706	22	11	29	St. H.	Lava	3		
707	22	11	29	St. H.	Lava	2		
708	22	11	29	St. H.	Lava	6+K	P. III	
767	23	10	4	St. H.	Lava			Not visited.
768	23	10	2		Lava			Do.
769	23	10	12		Lava			Do.
770	22	10	21	St. H.	Lava	1-2		
771	22	10	21	St. H.	Lava	1-2		
809	23	9	35	St. H.	Lava	5		
810	23	9	35	St. H.	Lava	5		
831	23	10	35	B. S.	Lava	5	P. II	

Deadmans Wash—Region of Bonito Park and Valley South of Deadmans Flat

10 sites. Map

408	23	8	17	E. L.	Lava	1	P. II	Loc. cit., Fig. 12, excavated.
409	23	8	17	E. L.	Lava	1	P. II	
859	23	8	17	E. L.		1	P. II	
860	23	8	17	E. L.		6?	P. II; B. M. III.	
861	23	8	17	E. L.		4?	P. II	
862	23	8	7	St. H.	Lava		P. II	Medicine fort.
863	23	8	7	Cave			P. II	Medicine cave.
864	23	9	12	E. L.			P. II	
865	23	9	12	E. L.			P. II	
866	23	8	5	E. L.			P. II	

Deadmans Wash—Region of Deadmans Flat

44 sites. Map 1

181	24	8	29	St. H.	Lava	4	P. II	
182	24	8	29	St. H.	Lava	1	P. II	
183	24	8	29	St. H.	Lava	1	P. II	
185	24	8	30	St. H.	Lava	1-2	P. II	
186	24	8	30	E. L.	Lava	1	P. II	
187	24	8	30	E. L.	Lava	1	P. II	
188	24	8	30	E. L.	Lava	1	P. II	
189	24	8	30	St. H.	Lava	1	P. II	
190	24	8	30	St. H.	Lava	1	P. II	
192	24	8	30	St. H.	Lava	5	P. II	
193	24	8	30	St. H.	Lava	4	P. II	
194	24	8	30	St. H.	Lava	2	P. II	
208	24	8	21	St. H.	Lava	4	P. II	
209	24	8	21	E. L.	Lava	1	P. II	
210	24	8	21	E. L.	Lava	1	P. II	
212	24	8	21	E. L.	Lava	1	P. II	
214	24	8	21	E. L.	Lava	1	P. II	
415	24	8	29	St. H.	Lava	8?	P. II	

Deadmans Wash—Region of Deadmans Flat—Continued

44 sites. Map 1—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
417	24	8	29	E. L.	Lava	1	P. II	
418	24	8	29	E. L.	Lava	1	P. II	
419	24	8	29	E. L.	Lava	1	P. II	
420	24	8	29	E. L.	Lava	1	P. II	
421	24	8	29	St. H.	Lava	1	P. II	
422	24	8	29	St. H.	Lava	1	P. II	
423	24	8	29	St. H.	Lava	1	P. II	
424	24	8	16	St. H.	Lava	12±3	P. II	
425	24	8	16	St. H.	Lava	9±2	P. II	
426	24	8	16	St. H.	Lava	1	P. II	
427	24	8	16	St. H.	Lava	5+1	P. II	
428	24	8	16	St. H.	Lava	1	P. II	
429	24	8	16	St. H.	Lava	3	P. II	
430	24	8	16	St. H.	Lava	6	P. II	
598	24	8	21	E. L.	Lava	3	P. II	
599	24	8	16	St. H.	Lava	8	P. II	
600	24	8	16	E. L.	Lava	1	P. II	
601	24	8	16	St. H.	Lava	1	P. II	
602	24	8	21	St. H.	Lava	4	P. II	
603	24	8	21	E. L.	Lava	1	P. II	
1286	24	8	31	E. L.		10	P. II	
1287	24	8	31	E. L.		1	P. II	
1288	24	8	31	E. L.		3	P. II	
1289	24	8	32	E. L.		3	P. II	
1299	24	8	30	B. S.		?	P. II	
1606	24	8	30	E. L. G.	Lava	1		
1607	24	8	30	E. L. G.	Lava	1		
1608	24	8	30	E. L. G.	Lava	3		

Deadmans Wash—Region of Deadmans Mesa

17 sites. Map 1

1665	24	8	34	E. L.		15		
1666	24	8	34	E. L.		5		
1667	24	8	34	E. L.		1		
1668	24	8	34	E. L.		2		
1669	24	8	34	E. L.		1		
1670	24	8	27	E. L.		1		
1718	24	8	15	St. H.	Lava	10	P. III	
1759	24	8	16	E. L. G.	Lava	3	P. II	
1760	24	8	16	E. L. G.	Lava	3	P. II	
1761	24	8	16	E. L. G.	Lava	8	P. II	
1762	24	8	16	E. L. G.	Lava	4–6	P. II	
1763	24	8	16	E. L. G.	Lava	10	P. II	
1764	24	8	15	St. H.	Lava	3	P. III	Also 3 dep.
1765	24	8	15	Fort.	Lava	5	P. II	Also 4 dep. and St. H.
1766	24	8	15	E. L. G.	Lava	3	P. II	
1767	24	8	15	E. L. G.	Lava	5	P. II	
1768	24	8	15	E. L. G.	Lava	5	P. II	

Deadmans Wash—Region of Cedar Ridge

9 sites. Map 1

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
604	24	8	9	St. H.	Lava	2		
605	24	8	9	B. S.	Lava	1–3		
606	24	8	10	St. H.	Lava	3		
607	24	8	9	St. H.	Lava	2		
608	24	8	3	St. H.	Lava	5		
609	24	8	3	St. H.	Lava	2		
610	24	8	10	St. H.	Lava	1		
1089	24	8	9	St. H.	Lava		P. III	
1090	24	8	9	St. H.	Lava		P. III	

Deadmans Wash—Region of the Fourth Terrace

25 sites. Map 1

431	25	8	33	St. H.	Lava	1		
432	25	8	33	St. H.	Lava	1		
433	25	9	33	St. H.	Lava	1		
434	25	8	33	St. H.	Lava	1		
435	25	8	33	St. H.	Lava	2		
436	25	8	33	St. H.	Lava	1		
437	25	9	34	St. H.	Lava	4–6		
438	25	8	34	St. H.	Lava	30±5	P. III	
439	25	8	34	St. H.	Lava	1–2		
440	25	8	34	St. H.	Lava	3		
441	25	8	34	St. H.	Lava	3–5		
442	25	8	34	St. H.	Lava	2		
443	25	8	34	St. H.	Lava	3		
444	25	8	34	St. H.	Lava	2		
450	24	8	2	St. H.	Lava	5		
451	24	8	2	St. H.	Lava	1		
452	24	8	2	St. H.	Lava	4		
453	24	8	2	St. H.	Lava	1		
454	24	8	2	St. H.	Lava	1		
455	24	8	2	St. H.	Lava	5		
456	24	8	2	St. H.	Lava	4		
457	24	8	2	St. H.	Lava	45	P. III	Loc. cit., Fig. 13.
458	24	8	2	St. H.	Lava	3		
459	24	8	2	St. H.	Lava	22	P. III	Do.
460	24	8	2	St. H.	Lava	1		

Deadmans Wash—Region of the Third Terrace

13 sites. Map 1

445	25	8	34	St. H.	Lava	1		
448	25	8	34	St. H.	Lava	10–12	P. III	
449	25	8	34	St. H.	Lava	10	P. III	Loc. cit., Fig. 13.
582	25	8	34	St. H.	Lava	2		
583	25	8	27	St. H.	Lava	2–3	P. III	
584a	25	8	27	St. H.	Lava	4±K?	P. III	
584b	25	8	27	St. H.	Lava	3		
585	25	8	27	St. H.	Lava	4		
586	25	8	27	St. H.	Lava	2+4+K	P. III	
587	25	8	27	St. H.	Lava	2+K	P. III	
588	25	8	34	St. H.	Lava	2+K	P. III	
763	25	8	28	St. H.	Lava	1		
764	25	8	28	St. H.	Lava	1		
804	25	8	35	Bowl				

Deadmans Wash—Region of the Second Terrace

11 sites. Map 1

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
570	25	8	22	St. H.	Lava	2		
571	25	8	22	St. H.	Lava	1		
572	25	8	22	St. H.	Lava	1		
573	25	8	22	St. H.	Lava	1		
574	25	8	22	St. H.	Lava	12±2	P. III	
575	25	8	22	St. H.	Lava	3		
576	25	8	22	E. L.	Lava	1	P. II	Loc. cit., Fig. 13.
577	25	8	25	St. H.	Lava	3±1	P. III	Loc. cit., Fig. 13; natural mound.
578	25	8	23	St. H.	Lava	7		Loc. cit., Fig. 13.
579	25	8	23	St. H.	Lava	8		Do.
595	25	8	26	St. H.	Lava	2?		

Deadmans Wash—Region of the Lower Terrace

11 sites. Map 1

201	25	9	31	St. H.	S. S.	4–5		
591	25	8	25	St. H.	Lava	3+K		
592	25	9	31	St. H.	Lava	2–3		
593	25	9	31	St. H.	Lava	2		
594	25	8	36	St. H.	Lava	2?		
612	25	9	19	Cavate	Lava	2		
613	25	9	19	C. Sh.	S. S.	3		
614	25	9	19	St. H.	Lava	1		
615	25	9	19	St. H.	Lava	1		
616	25	8	24	St. H.	Lava	1		
617	25	8	24	St. H.	Lava	1		
789r	25	9	30	St. H.	Lava	?		Not visited.

Deadmans Wash—Region of Big Hawk Valley

22 sites. Map 1

201	25	8	21	St. H.	Lava	4–5		
618	25	8	24	St. H.	Lava	10±2	P. II	Loc. cit., Fig. 14, plan.
619	25	8	24	St. H.	Lava	1		
620	25	8	23	St. H.	Lava	2+K?		
621	25	8	23	St. H.	Lava	4–5		
622	25	8	23	St. H.	Lava	6		
623	25	8	23	B. S.	Lava	4		
674	25	8	15	St. H.	Lava	1		
675	25	8	15	St. H.	Lava	3		
678	25	8	14	St. H.	Lava	6	P. II; III	Loc. cit., Fig. 13, plan.
679	25	8	14	St. H.	Lava	1		
680	25	8	14	St. H.	Lava	3		
681	25	8	14	St. H.	Lava	4		
682	25	8	14	St. H.	Lava	5		Loc. cit., Fig. 13.
683	25	8	14	St. H.	Lava	4		
684	25	8	14	St. H.	Lava	1		
685	28	8	13	St. H.	Lava	3		
686	25	8	13	St. H.	Lava	1		
687	25	8	13	St. H.	Lava	6		
1176	25	8	14	St. H.	Lava	4	P. II	
1177	25	8	14	E. L. G.	Lava	3	P. II	
1178	25	8	14	E. L. G.	Lava		P. II	

Deadmans Wash—Region of Big Hawk Valley—Continued

22 sites. Map 1—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
1179	25	8	14	St. H	Lava	9	P. III	
1180	25	8	15	G	Lava	1	P. II	
1181	25	8	15	G	Lava	1		
1182	25	8	15	St. H	Lava	6	P. III	
1183	25	8	15	E. L. G	Lava	2	P. II–III	Transition.
1184	25	8	14	St. H	Lava	5		
1769	25	8	15	E. L. G	Lava	1	P. III	Also P. II, depression.
1771	25	8	15	St. H	Lava			

Deadmans Wash—Region of Hulls Canyon

12 sites. Map 1

559	25	9	28	St. H	L. S	2±1		
560	25	9	20	St. H	S. S. & L. S.	8		
561	25	9	20	St. H	?	?		Not visited.
562	25	9	20	St. H	L. S	4		
563	25	9	20	St. H	L. S	5		
564	25	9	20	St. H	L. S	5		
565	25	9	20	St. H	L. S	5		
566	25	9	20	St. H	L. S	2		
567	25	9	20	St. H	L. S	2		
568	25	9	20	St. H	L. S	3		
590	25	9	20	St. H	S. S	4+K	P. III	Red House.
688	25	9	18	St. H	Lava	1		

Antelope Wash—Citadel Region

59 sites. Map 1

342	25	8	12	St. H	L. S	7		Barrett, No. 23, plan; Ruin M (Fewkes ?).
343	25	9	7	St. H	S. S	+K	P. III	Barrett, No. 24, plan.
344	25	9	6	St. H	S. S	2	P. III	Barrett, No. 25, plan.
345	25	9	6	St. H	S. S	2	P. III	Barrett, No. 26, plan.
346	25	9	6	St. H	S. S	3	P. III	Barrett, No. 27, plan.
347	25	9	6	St. H	S. S	3	P. III	Barrett, No. 28, plan.
348	25	9	6	St. H	S. S	2	P. III	Barrett, No. 30, plan.
349	25	9	6	Kiva	S. S	1	P. III	Barrett, No. 31, plan.
350	25	9	6	St. H	S. S	1	P. III	Barrett, No. 32, plan.
351	25	9	6	St. H	S. S	5+K	P. III	Barrett, No. 33, plan.
352	25	9	6	St. H	Lava	18	P. III	Barrett, No. 34, plan.
353	25	9	6	St. H	S. S. & Lava	2+K	P. III	
354a	25	9	6	St. H	S. S. & Lava	6	P. III	Barrett, No. 52, plan.
354b	25	9	6	St. H	S. S. & Lava	3	P. III	Barrett, Nos, 53 and 54, plan.
354c	25	9	6	B. S	S. S. & Lava	3	P. II	Loc. cit., Fig. 14, plan.
355	25	9	7	St. H		40±10	P. III	Fewkes, 04, p. 43, Citadel; loc. cit., Fig. 15.
						K1		Fewkes, 04, pl. viii, illus.
356	25	9	7	St. H	Lava	5?	?	Barrett, No. 2, plan.
357	25	9	7	St. H	Lava	10±3	P. III	Loc. cit., Fig. 15, plan; Barrett, No. 5.
358	25	9	7	St. H	S. S	10±3	P. III	Barrett, No. 7; loc. cit., Fig. 15.
359	25	9	6	St. H	S. S. & Lava	3+K	P. III	Ruin A (Fewkes), illus.
360	25	9	7	St. H	Lava	5	P. III	B. C. D (Fewkes), illus.
361	25	9	6	Fort	Lava	1	P. III	Ruin E (Fewkes).

Antelope Wash—Citadel Region—Continued

59 sites. Map 1—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
362	25	9	7	St. H.	Lava	4	P. III	Ruin F (Fewkes), tank below.
363	25	9	5	St. H.	Lava	1		
364	25	9	5	St. H.	Lava	1		
365	25	9	6	St. H.	Lava	1		
366	25	9	5	St. H.	Lava	2		Barrett, No. 21, plan.
367	25	9	6	St. H.	Lava	5		
368	25	9	6	St. H.	Lava	1		
319	25	9	6	St. H.	Lava	2		
370	25	9	6	St. H.	Lava	2		
371	25	9	6	St. H.	L. and S. S.	6		
372	25	9	6	St. H.	L. and S. S.	1		
373	25	9	6	St. H.	L. and S. S.	13		
374	25	9	6	St. H.	L. and S. S.	7	P. II	
375	25	9	6	St. H.	Lava	3		
377	25	9	6	St. H.	S. S.	3+K	P. III	Ruin I (Fewkes), Barrett, No. 41, plan; Ruin H (Fewkes), well in Kiva.
378	25	9	6	St. H.	S. S.	2	P. III	Ruin G (Fewkes), Barrett, No. 37, plan.
379	25	9	6	St. H.	S. S. and L. S.	8+court.	P. III	Fewkes, 04, Fig. 5, plan; Ruin J (Fewkes), Barrett, No. 43, plan.
382	25	9	6	St. H.	S. S.	4	P. III	Ruin K (Fewkes), Barrett, No. 47, plan.
383	25	9	6	St. H.	L. S.	5		Ruin K (Fewkes), Barrett, No. 48, plan.
384	25	9	6	St. H.	L. S.	2?	P. III	Ruin L (Fewkes), Barrett, No. 50, plan.
536	26	9	31	St. H.	L. S.	1		
656	26	9	32	St. H.	Lava	?		Not visited.
691	25	8	12	St. H.	L. S.	2-3?		
692	25	8	12	St. H.	L. S.	2-3?		
693	25	8	1	St. H.	L. S.	3		
694	25	8	1	St. H.	L. S.	2		
695	25	9	6	St. H.	L. S.	2?	P. III	
696	26	9	32	St. H.	Lava	?		
697	26	9	32	St. H.	Lava	4		
698	26	9	32	St. H.	L. S.			
757	25	8	12	St. H.	Lava			Not visited.
758	25	8	12	St. H.	Lava			Do.
759	25	9	7	St. H.	Lava			Do.
760	25	9	7	St. H.	Lava			Do.
761	25	9	7	St. H.	Lava			Do.
992	26	9	6	E. L.	S. S.	2	B. M. III	
1185	26	9	6	E. L.	Lava	1	P. II	
1770	26	9	6	E. L.	Lava	2	P. II	

Antelope Wash—Antelope Prairie Region

15 sites. Map 1

624	25	9	5	St. H.	S. S.	4		
641	25	9	11	St. H.	L. S.	2?		
642	25	9	11	St. H.	L. S.	2+K		
643	25	9	2	St. H.	L. S.	5		
644	25	9	11	St. H.	L. S.	2		
645	25	9	11	St. H.	L. S.	1-2		

Antelope Wash—Antelope Prairie Region—Continued

15 sites. Map 1—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
646	25	9	3	St. H.	L. S.	4		
648	25	9	4	St. H.	L. S.	4?		
649	26	9	33	St. H.	L. S.	4?		
650	25	9	3	St. H.	L. S.	4		
651	25	9	3	St. H.	L. S.	1		
652	25	9	3	St. H.	L. S.	4+K		Loc. cit., Fig. 13.
653	25	9	9	St. H.	L. S.	4		
654	25	9	9	St. H.	S. S. and L. S.	10		
655	25	9	8	St. H.	L. S.	1		

Little Colorado, Wupatki Basin—Crack-in-the Rock Region

60 sites. Map 2

537	26	10	20	St. H.	S. S.	8	P. III	Loc. cit., Fig. 18.
538	26	10	20	St. H.	S. S.	1		
539	26	10	20	St. H.	S. S.	1		
540	26	10	20	St. H.	S. S.	1	P. III	
541	26	10	20	St. H.	S. S.	1	P. III	
542	26	10	20	St. H.	S. S.	1	P. III	
543	26	10	20	St. H.	S. S.	1	P. III	
544	26	10	20	St. H.	S. S.	1	P. III	
545	26	10	20	St. H.	S. S.	5	P. III	
546	26	10	20	St. H.	S. S.	3	P. III	
547	26	10	20	St. H.	S. S.	1	P. III	
548	26	10	20	St. H.	S. S.	1	P. III	
549	26	10	20	St. H.	S. S.	1	P. III	
550	26	10	20	St. H.	S. S.	1	P. III	
551	26	10	20	St. H.	S. S.	1	P. III	
552	26	10	20	St. H.	S. S.	1	P. III	
553	26	10	20	St. H.	S. S.	1	P. III	
554	26	10	20	St. H.	S. S.	1	P. III	
555	26	10	20	St. H.	S. S.	1	P. III	
556	26	10	20	St. H.	S. S.	3	P. III	
557	26	10	20	St. H.	S. S.	5-6	P. III	
558	26	10	20	St. H.	S. S.	2+K	P. III	
754	26	10	32	St. H.	S. S.?	(?)	P. III	
755	26	10	32	St. H.	S. S.?	(?)	P. III	
808	26	10	2	St. H.	S. S.	1		
806	26	10	2	St. H.	S. S.	1		

Little Colorado, Wupatki Basin—Antelope Wash Region

16 sites. Map 2

625	25	9	12	St. H.	S. S.	8	III	Loc. cit., Fig. 17.
626	25	9	12	B. S.	S. S.	1		
627	25	9	12	B. S.	S. S.	1		
628	25	9	1	St. H.		1+2		
629	25	9	1	St. H.	S. S.	5		
630	25	9	1	St. H.	S. S.	4-5		
631	25	10	6	St. H.	S. S.	4+6		
632	25	10	6	St. H.	S. S.	1+2		
633	25	10	7	St. H.	S. S.	1+K?		

Little Colorado, Wupatki Basin—Antelope Wash Region—Continued

16 sites. Map 2—Continued

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
634	25	10	7	St. H	S. S	3		
635	25	10	7	St. H	S. S	2		
636	25	10	7	St. H	S. S	1–2		
637	25	9	12	St. H	S. S	2		
638	25	10	13	B. S	L. S	2–3		
639	25	10	18	St. H	S. S	1–2?		
640	25	10	18	St. H	S. S	6		

Little Colorado, Wupatki Basin—Wupatki Region

29 sites. Map 2

202	25	10	29	St. H	S. S	6	P. III	Fewkes, 04, p. 59, plan; Ruin B, Group C (Fewkes).
203	25	10	21	St. H	S. S	6–8	P. III	Wukoki (Clarke), Tower House; Ruin A, Group C (Fewkes).
204	25	9	23	B. S	Lava	1		Cinder cones.
205	25	9	23	B. S	Lava	1		
206	25	9	23	B. S	Lava	1		
207	25	9	23	B. S	Lava	1		
404	25	10	30	St. H	S. S	3		
405, 406	25	10	30	St. H	S. S	45	P. III	Fewkes, 04, p. 48, plan; Wupatki, Clarke; Ruin A, Group B, Fewkes. Sitgreaves, 52, pl. 12. Loc. cit., Fig. 16.
407	25	10	30	St. H	S. S	2	P. II–III	
410	25	10	31	B. S	Lava	1	P. II	Mesa.
411	25	10	31	B. S	Lava	1	P. II	
756	25	10	29	St. H	S. S	2?		
1751	24	10	6	E. L. G	S. S	2	P. II	
1752	24	10	6	Cyst	S. S			
1753	24	10	6	Sh. A			P. II	
1754	24	10	32	Oval pit	S. S	1		
1755	24	10	30	St. H	S. S	2	P. III	
1756	24	10	30	Mound	S. S	?	P. II	
1757	25	9	26	St. H	L. S	3	P. III	
1758	25	9	26	St. H	L. S	2	P. III	

Little Colorado—Rodin Basin

11 sites. Map 2

No. of ruin	Township north	Range east	Section	Kind of house	Material	No. of rooms	Period	Remarks
412	24	10	27	St. H	Lava	5		
413	24	10	26	St. H	Lava	?		
580	24	11	16	Fort	L. S	1		Loc. cit. Fig. 19 and 20 Long Fort.
701	24	11	20	St. H	S. S	2	2	
702	24	11	20	St. H	S. S	1		
703	24	11	20	St. H	S. S	3		
715	24	10	24	St. H	S. S	3	2?	
750	24	11	6	St. H	S. S			Not visited.
751R	24	10	11	St. H	S. S			Do.
752	24	11	19	St. H	S. S			Do.
753	24	11	33	St. H	S. S			Do.

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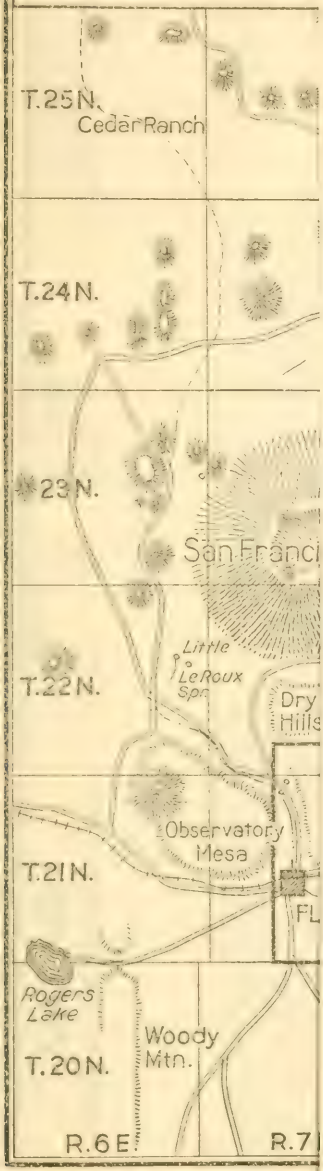
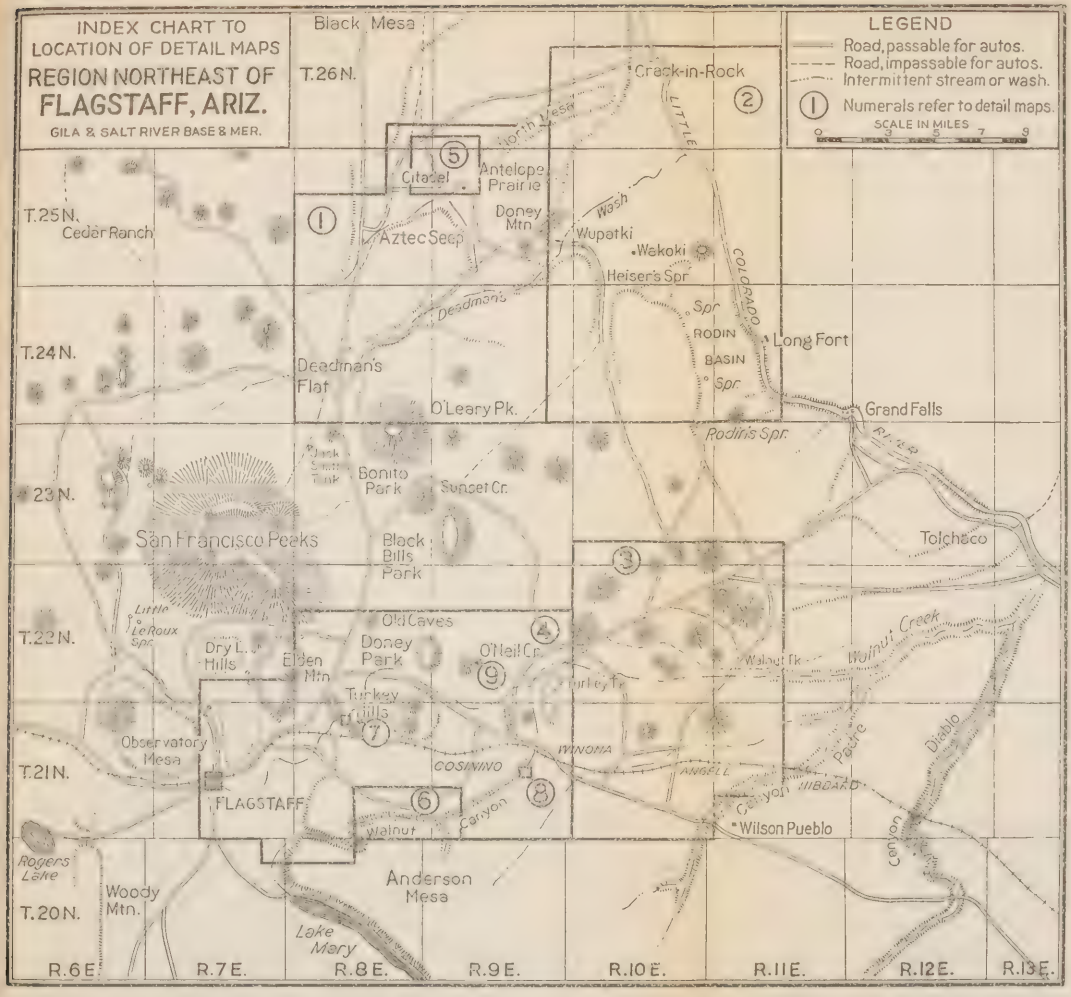
ERRATA

PLATE 6.—Wakoki should be Wukoki.
PLATE 7.—Bow ? should be Bowl. Garnet Canyon should be Grand Canyon.
PLATE 8.—Wakoki should be Wukoki.
PLATE 10.—River de Flag should be Rio de Flag.

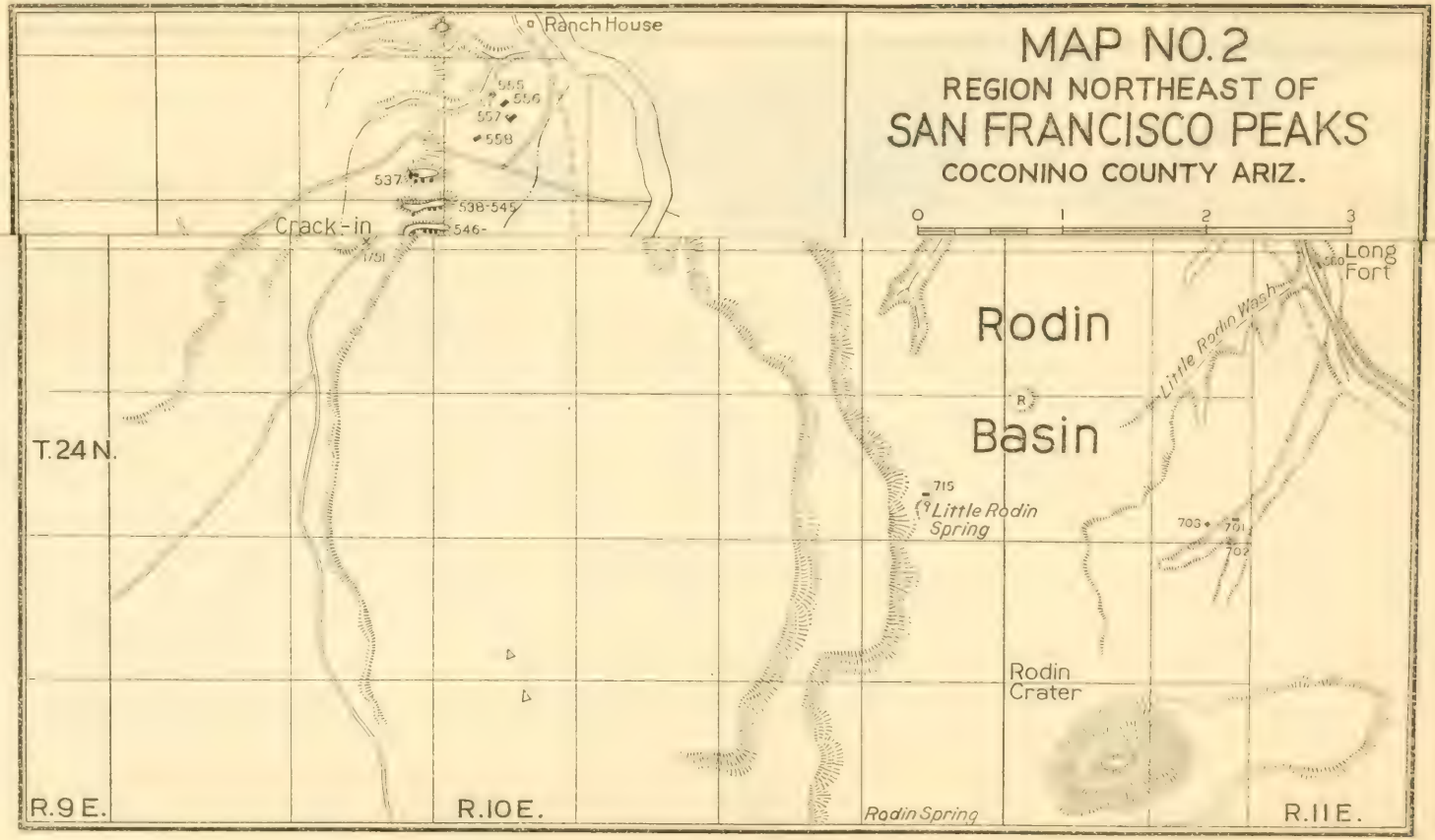
INDEX CHART T
LOCATION OF DETAIL M
REGION NORTHEAST
FLAGSTAFF, AR
GILA & SALT RIVER BASE & M

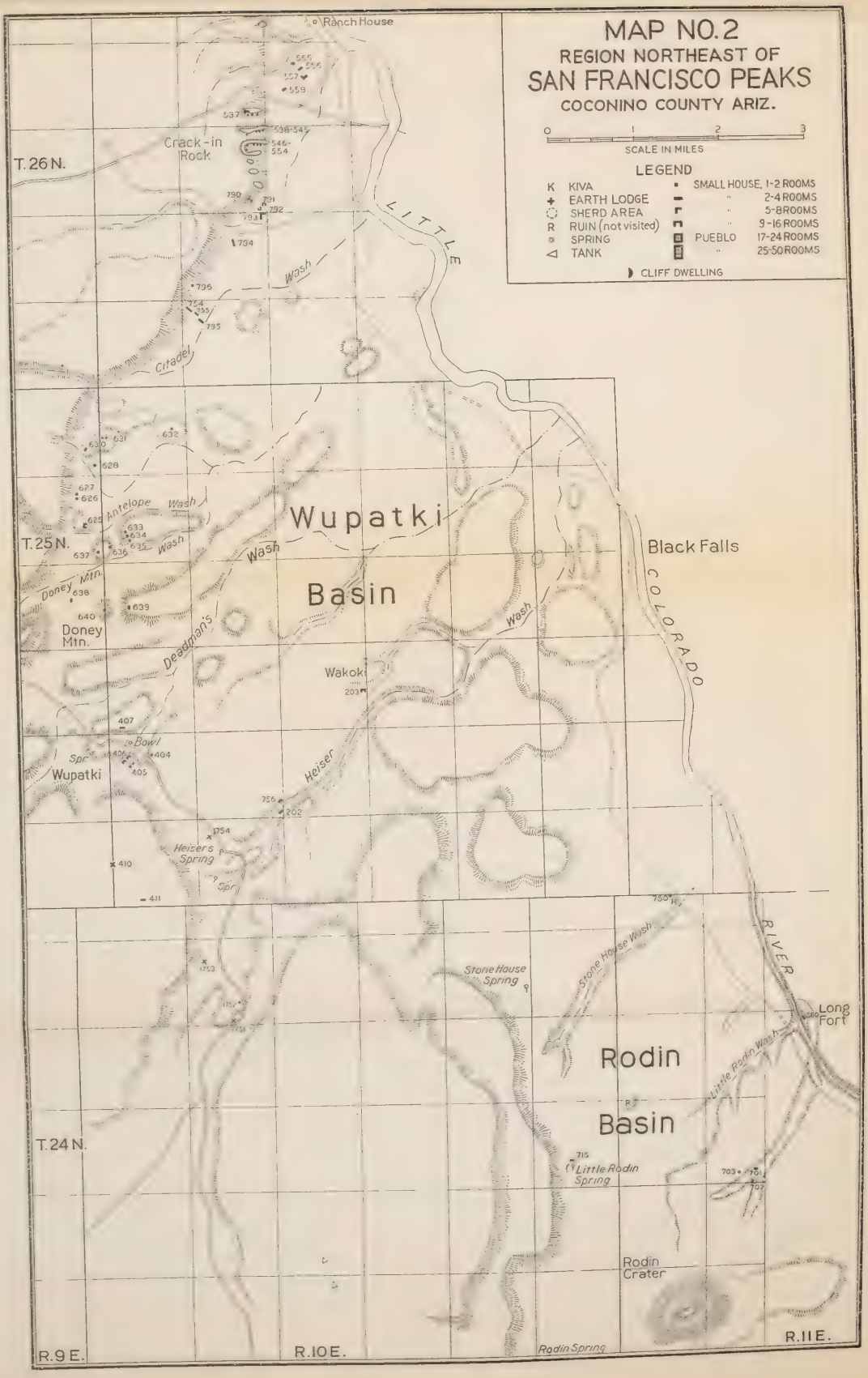


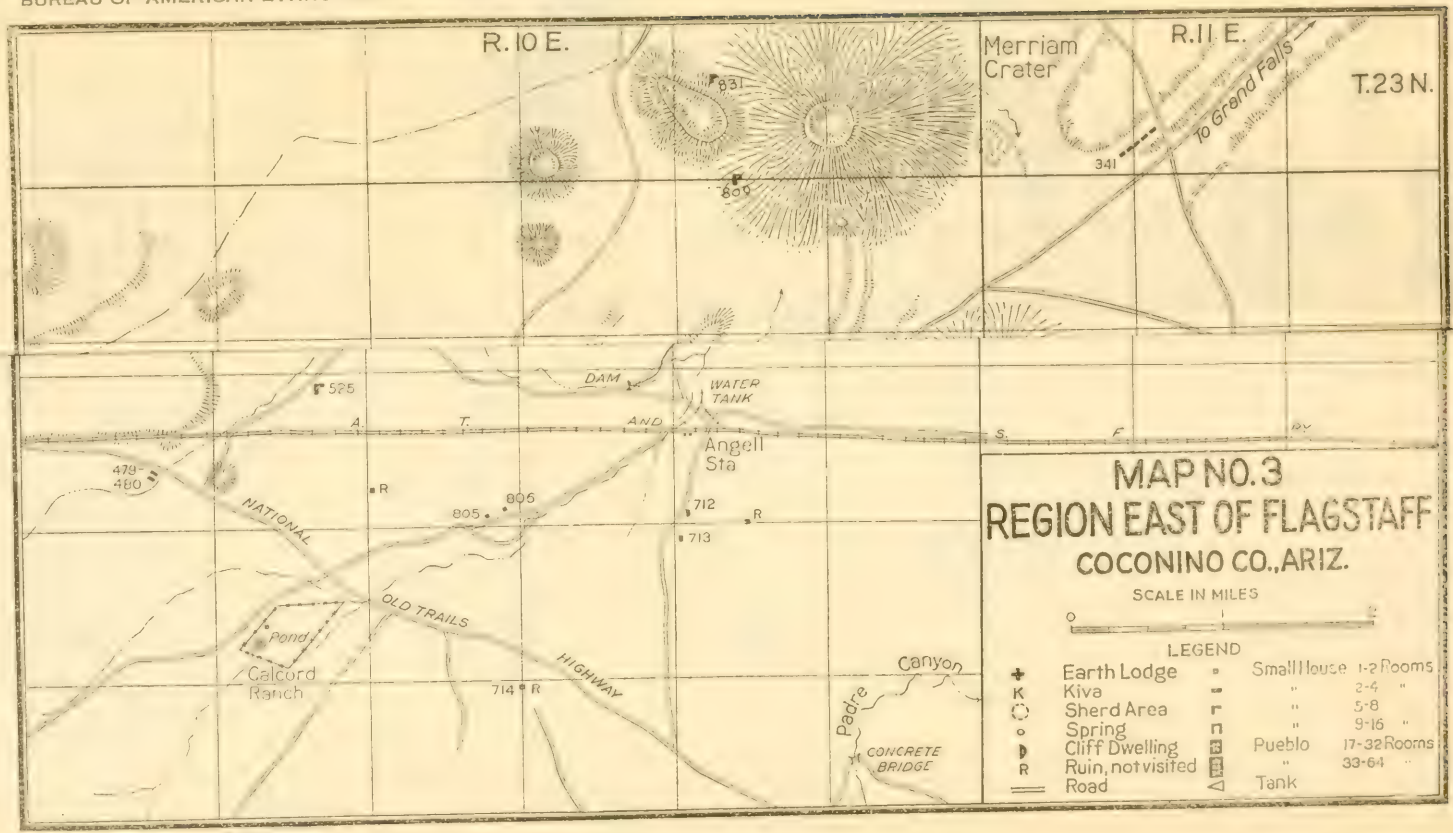

INDEX CHART TO LOCATION OF DETAIL MAPS
REGION NORTHEAST OF FLAGSTAFF, ARIZ.
GILA & SALT RIVER BASE & MER.
LEGEND
Road, passable for autos.
Road, impassable for autos.
Intermittent stream or wash.
Numerals refer to detail maps.
SCALE IN MILES
Black Mesa
T.26N.
Crack-in-Rock
Little
North Mesa
Citadel
Antelope Prairie
T.25N.
Cedar Ranch
Aztec Seep
Doney Mtn.
Wash
Wupatki
Wakoki
Heiser's Spr.
Colorado
Deadman's
Spr.
RODIN
BASIN
Spr.
Long Fort
T.24N.
Deadman's Flat
O'Leary Pk.
Grand Falls
Podina Spr.
Bonito Park
Sunset Cr.
23N.
San Francisco Peaks
Black Bills Park
Tolchaco
Old Caves
Little LeRoux Spr.
Dry L. Hills
Doney Park
O'Neil Cr.
Walnut Fk.
Walnut Creek
T.22N.
Elden Mtn.
Turkey Hills
Observatory Mesa
Cosnino
Wynona
Angell
Peaks
Diablo
T.21N.
Flagstaff
Canyon
Wilson Pueblo
Rogers Lake
Woody Mtn.
Anderson Mesa
T.20N.
Lake Mary
R.6E.
R.7E.
R.8E.
R.9E.
R.10E.
R.11E.
R.12E.
R.13E.

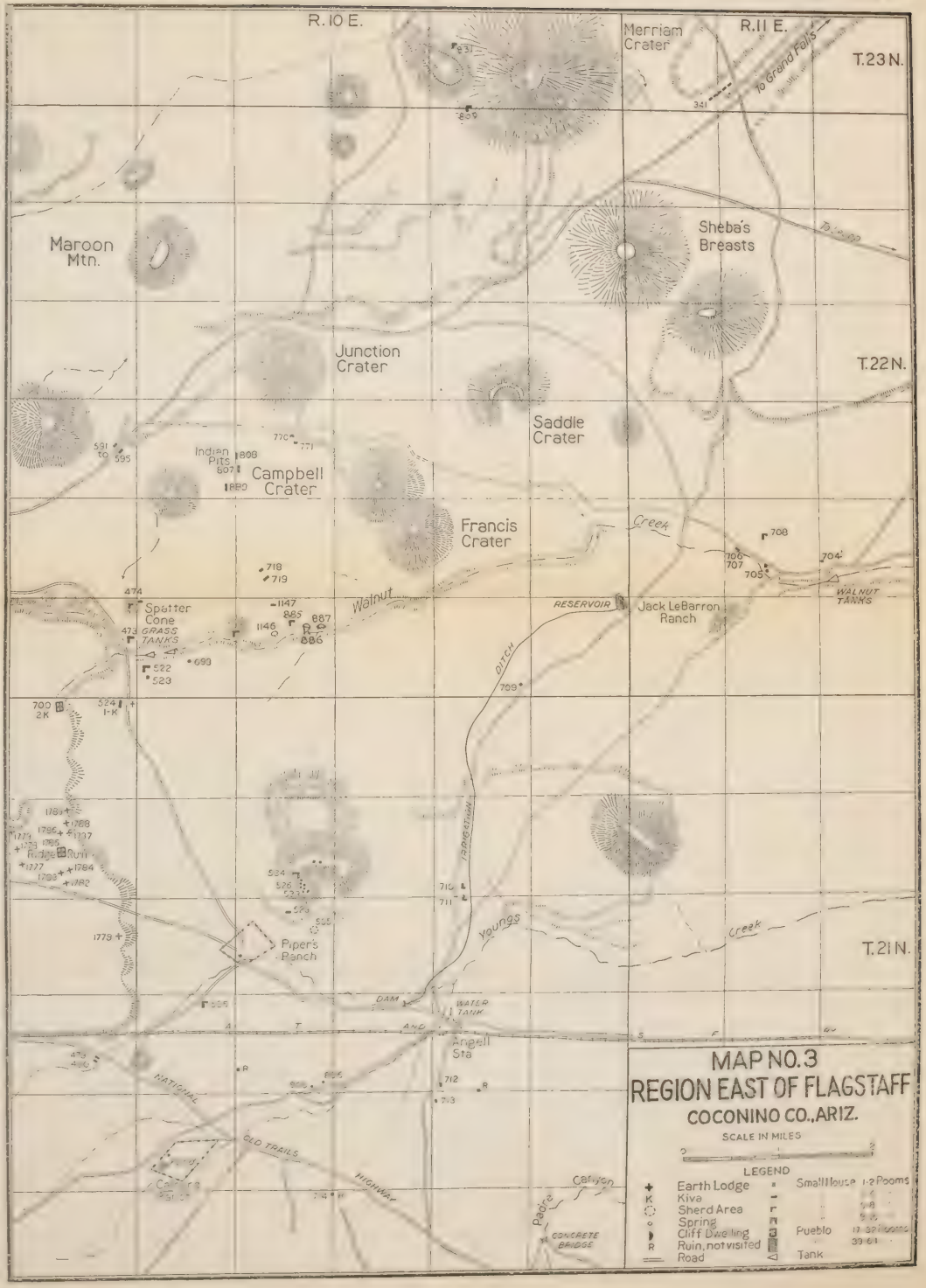
MAP NO. I
REGION NORTHEAST OF
R.8E.
R.9E.
T.26 N.

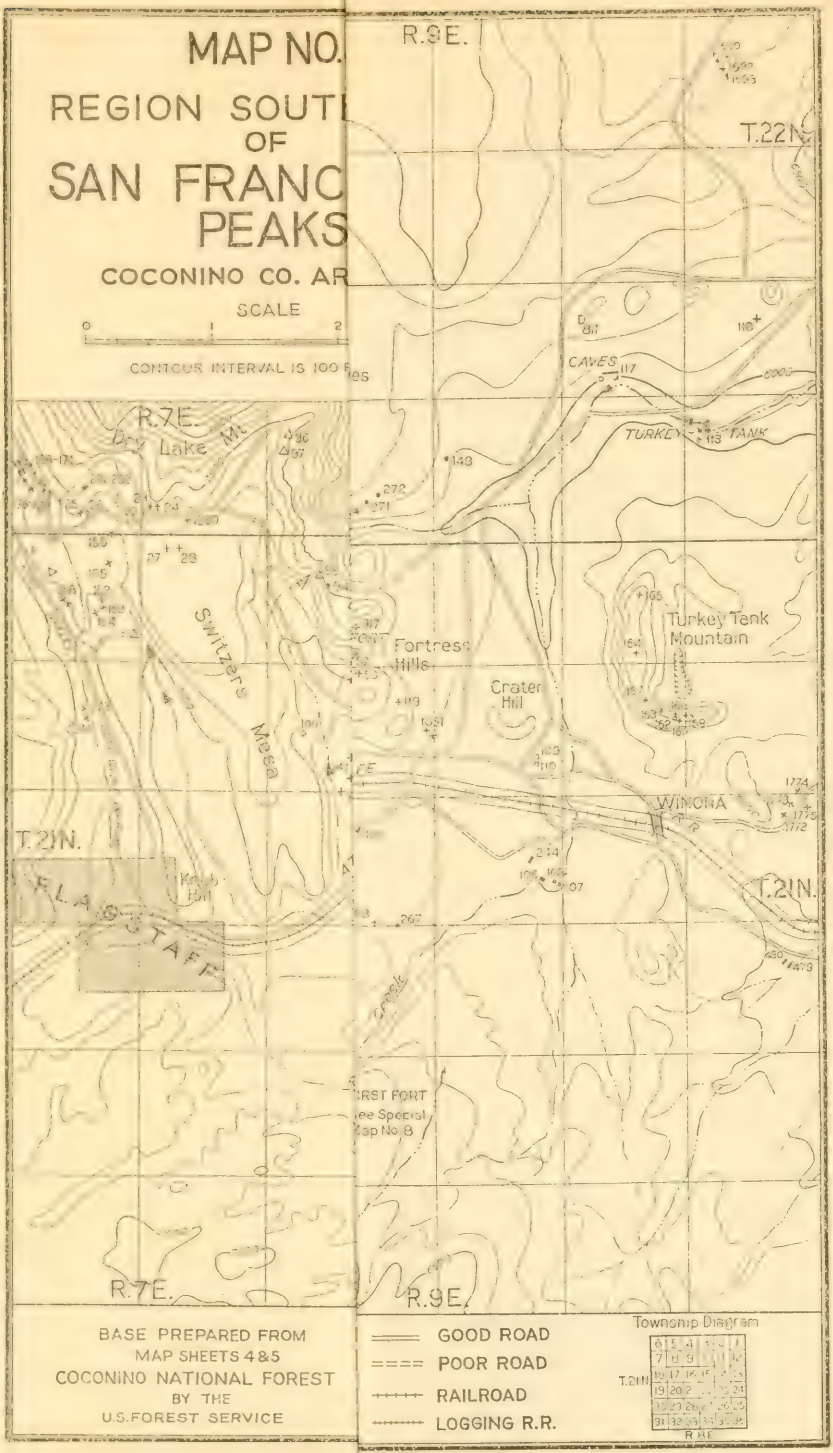
MAP NO. 1
REGION NORTHEAST OF
SAN FRANCISCO PEAKS
COCONINO COUNTY ARIZ.
0 1 2
LEGEND
K KIVA
EARTH LODGE
SHEEP CORRAL AREA
R RUIN (not visited)
SPRING
TANK
SMALL HOUSE, 1-2 ROOMS
" 2-4 ROOMS
" 9-16 ROOMS
PUEBLO 17-24 ROOMS
R.8E.
R.9E.
T.26N.
T.25N.
T.24N.
2nd Terrace
3rd Terrace
4th Terrace
Cedar Ridge
O' LEARY
LAVA FLOW


MAP NO. 2
REGION NORTHEAST OF
SAN FRANCISCO PEAKS
COCONINO COUNTY ARIZ.
0 1 2 3
Ranch House
555
556
557
558
537
538-545
546-
Crack-in
1751
Long Fort
Rodin
Basin
Little Rodin Wash
T.24 N.
715
Little Rodin Spring
703
701
702
Rodin Crater
R.9 E.
R.10 E.
Rodin Spring
R.11 E.


MAP NO. 2
REGION NORTHEAST OF
SAN FRANCISCO PEAKS
COCONINO COUNTY ARIZ.
SCALE IN MILES
LEGEND
K KIVA
EARTH LODGE
SHERD AREA
R RUIN (not visited)
SPRING
TANK
SMALL HOUSE, 1-2 ROOMS
2-4 ROOMS
5-8 ROOMS
9-16 ROOMS
PUEBLO 17-24 ROOMS
25-50 ROOMS
CLIFF DWELLING
Ranch House
Crack-in Rock
T. 26 N.
LITTLE COLORADO
Wash
Citadel
Wupatki
Basin
Antelope Wash
Wash
T. 25 N.
Doney Mtn.
Deadmans Wash
Wash
Black Falls
COLORADO
Wakoki
Bowl
Spr
Wupatki
Heiser Wash
Heiser's Spring
Spr
Stone House Spring
Stone House Wash
RIVER
Long Fort
Rodin
Basin
Little Rodin Wash
T. 24 N.
Little Rodin Spring
Rodin Crater
R. 9 E.
R. 10 E.
Rodin Spring
R. 11 E.


R. 10 E.
R. 11 E.
T. 23 N.
Merriam Crater
831
800
341
To Grand Falls
525
DAM
WATER TANK
A. T. AND S. F. RY.
Angell Sta
479-480
R
805
806
712
713
R
NATIONAL
OLD TRAILS HIGHWAY
Pond
Calcord Ranch
714 R
Canyon
Padre
CONCRETE BRIDGE
MAP NO. 3
REGION EAST OF FLAGSTAFF
COCONINO CO., ARIZ.
SCALE IN MILES
0
LEGEND
Earth Lodge
Kiva
Sherd Area
Spring
Cliff Dwelling
Ruin, not visited
Road
Small House 1-2 Rooms
" 2-4 "
" 5-8 "
" 9-16 "
Pueblo 17-32 Rooms
" 33-64 "
Tank


R. 10 E.
R. 11 E.
Merriam Crater
T. 23 N.
To Grand Falls
Maroon Mtn.
Sheba's Breasts
To Flagstaff
Junction Crater
T. 22 N.
Saddle Crater
Indian Pits
Campbell Crater
Francis Crater
Creek
Walnut
Spotter Cone
GRASS TANKS
RESERVOIR
Jack LeBarron Ranch
WALNUT TANKS
DITCH
PIPESTEM
Piper's Ranch
Youngs
Creek
T. 21 N.
DAM
WATER TANK
Angell Sta
NATIONAL
OLD TRAILS
HIGHWAY
Canyon
Padre
CONCRETE BRIDGE
MAP NO. 3
REGION EAST OF FLAGSTAFF
COCONINO CO., ARIZ.
SCALE IN MILES
LEGEND
Earth Lodge
Kiva
Sherd Area
Spring
Cliff Dwelling
Ruin, not visited
Road
Small House
Pueblo
Tank


MAP NO.
REGION SOUTH
OF
SAN FRANC
PEAKS
COCONINO CO. AR
SCALE
CONTOUR INTERVAL IS 100 F
R.9E.
T.22N.
CAVES
TURKEY TANK
R.7E.
Dry Lake Mt.
Switzers Mesa
Fortress Hills
Crater Hill
Turkey Tank Mountain
WINONA
T.21N.
FLAG STAFF
R.7E.
R.9E.
BASE PREPARED FROM
MAP SHEETS 4&5
COCONINO NATIONAL FOREST
BY THE
U.S. FOREST SERVICE
GOOD ROAD
POOR ROAD
RAILROAD
LOGGING R.R.
Township Diagram
T.21N.
R.8E.

MAP NO.4
REGION SOUTHEAST OF
SAN FRANCISCO PEAKS
COCONINO CO. ARIZONA
SCALE
R.8E.
R.9E.
R.7E.
T.22N.
T.21N.
T.20N.
Doney Park
Mountain
Elden
Sheep Hill
Turkey Hill
PICTURE CANYON
CLIFFS
Gouro
Fortress Hills
Turkey Tank Mountain
WINONA
FLAGSTAFF
Walnut Canyon
BASE PREPARED FROM MAP SHEETS 485 COCONINO NATIONAL FOREST BY THE U.S. FOREST SERVICE
TANK
FLOWING STREAM
INTERMITTENT STREAM
WELLS
SPRING
SMALL HOUSE RUINS
EARTH LODGE
SHERD AREA
PUEBLO 5 TO 8 ROOMS
9 TO 16 "
17 TO 24 "
GOOD ROAD
POOR ROAD
RAILROAD
LOGGING R.R.

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